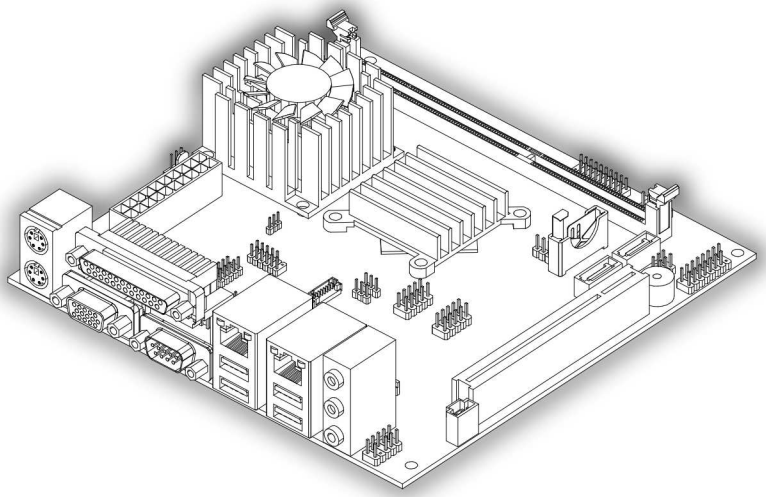
VB7009



VIA Embedded

USER MANUAL

VB7009

Mini-ITX embedded board

1.15-07012013-172200

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Regulatory Compliance

FCC-A Radio Frequency Interference Statement

This equipment has been tested and found to comply with the limits for a class A digital device, pursuant to part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at his personal expense.

Notice 1

The changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

Notice 2

Shielded interface cables and A.C. power cord, if any, must be used in order to comply with the emission limits.

Notice 3

The product described in this document is designed for general use, VIA Technologies assumes no responsibility for the conflicts or damages arising from incompatibility of the product. Check compatibility issue with your local sales representatives before placing an order.

CE

FC Tested To Comply
With FCC Standards
FOR HOME OR OFFICE USE

Battery Recycling and Disposal

- ☐ Only use the appropriate battery specified for this product.
- ☐ Do not re-use, recharge, or reheat an old battery.
- ☐ Do not attempt to force open the battery.
- ☐ Do not discard used batteries with regular trash.
- ☐ Discard used batteries according to local regulations.

Safety Precautions

- ☐ Always read the safety instructions carefully.
- ☐ Keep this User's Manual for future reference.
- ☐ All cautions and warnings on the equipment should be noted.
- ☐ Keep this equipment away from humidity.
- ☐ Lay this equipment on a reliable flat surface before setting it up.
- ☐ Make sure the voltage of the power source and adjust properly 110/220V before connecting the equipment to the power inlet.
- ☐ Place the power cord in such a way that people cannot step on it.
- ☐ Always unplug the power cord before inserting any add-on card or module.
- ☐ If any of the following situations arises, get the equipment checked by authorized service personnel:
  - The power cord or plug is damaged.
  - Liquid has penetrated into the equipment.
  - The equipment has been exposed to moisture.
  - The equipment has not worked well or you cannot get it work according to User's Manual.
  - The equipment has dropped and damaged.
  - The equipment has obvious sign of breakage.
- ☐ Do not leave this equipment in an environment unconditioned or in a storage temperature above 60°C (140°F). The equipment may be damaged.
- ☐ Do not leave this equipment in direct sunlight.
- ☐ Never pour any liquid into the opening. Liquid can cause damage or electrical shock.
- ☐ Do not place anything over the power cord.
- ☐ Do not cover the ventilation holes. The openings on the enclosure protect the equipment from overheating

Box Contents and Ordering Information

VB7009-16

- ☐ 1 x VB7009 embedded board (with C7®-D 1.6 GHz NanoBGA2 processor)
- ☐ 1 x I/O bracket
- ☐ 1 x SATA cable

VB7009-10E

- ☐ 1 x VB7009 embedded board (with C7® 1.0 GHz NanoBGA2 processor)
- ☐ 1 x I/O bracket
- ☐ 1 x SATA cable

VB7009-12XC

- ☐ 1 x VB7009 embedded board (with NanoX2 1.2 GHz NanoBGA2 processor)
- ☐ 1 x I/O bracket
- ☐ 1 x SATA cable

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1. Product Overview

The VIA VB7009 Mini-ITX mainboard is an entry-level native x86 mainboard designed mainly for embedded and thin client applications. It can also be used for various domain applications such as desktop PC, industrial PC, etc. The mainboard is based on the VIA VX900 Unified Digital Media IGP chipset that features the VIA Chrome™ 9 HC with 2D/3D graphics and video accelerators for rich digital media performance.

The VIA VB7009 includes a secure and power efficient VIA C7®-D / C7® / Nano X2 NanoBGA2 processor. The VIA C7®-D / C7® / Nano X2 NanoBGA2 processor includes the VIA Padlock Security Engine, VIA StepAhead™ Technology Suite, VIA PowerSaver™, and VIA CoolStream™ technology.

The VIA VB7009 has one 1066 MHz DDR3 DIMM slot that support up to 4 GB memory size. The VIA VB7009 provides support for high fidelity audio with its included VIA VT1708S High Definition Audio codec. In addition it supports two SATA 3Gb/s storage devices.

The VIA VB7009 is compatible with a full range of Mini-ITX chassis as well as FlexATX and MicroATX enclosures and power supplies. The VIA VB7009 is fully compatible with Microsoft® and Linux operating systems.

1.1. Key Features and Benefits

1.1.1. VIA C7®-D / C7® / Nano X2 NanoBGA2 Processor

The VIA C7®-D / C7® / Nano X2 NanoBGA2 is an x86 processor packed into an ultra compact NanoBGA2 package (measuring 21mm x 21mm). It delivers an energy-efficient yet powerful performance, with cool and quiet operation that makes it ideal for embedded system applications.

The VIA C7®-D / C7® is a single core 32-bit processor based on 90 nanometer process technology, and it is the world's first Carbon Free processor.

The VIA Nano X2 is a 64-bit dual core processor that can deliver an improved multitasking ability without consuming more power. It is based on the latest 40 nanometer process technology.

1.1.2. VIA VX900 Chipset

The VIA VX900 Unified Digital Media Chipset is designed to enable high quality digital video streaming and DVD playback in a new generation of fanless, small form factor PCs and IA devices. The VIA VX900 features VIA Chrome™ 9 HC3 with 2D/3D graphics and video acceleration, DDR3 1066/800 support, motion compensation and dual display support to ensure a rich overall entertainment experience.

1.1.3. Modular Expansion Options

The VIA VB7009 ensures long-term usability with its support for industry standard expansion options. Its support for legacy PCI expansion cards helps to smooth and reduce the costs of transitioning to newer expansion technologies. The VIA VB7009 enables companies to slowly roll out upgrades as necessary instead of having to replace everything all at once. This ensures that companies using the VB7009 obtain the maximum benefits from its past investments in PCI expansion cards.

1.2. Product Specifications

- **Processor**
  - VIA C7®-D 1.6 GHz NanoBGA2 (for VB7009-16 SKU[1])
    - Supports 800MHz Front Side Bus
    - 21 x 21 mm FCBGA
  - VIA C7® 1.0 GHz NanoBGA2 (for VB7009-10E SKU[2])
    - Supports 400MHz Front Side Bus
    - 21 x 21 mm FCBGA
  - VIA Nano X2 1.2 GHz NanoBGA2 (for VB7009-12XC SKU[1])
    - Supports 800MHz Front Side Bus
    - 21 x 21 mm FCBGA

- **Chipset**
  - VIA VX900 Unified Digital Media IGP chipset
  - 31 mm x 31 mm FCBGA

- **System Memory**
  - 1 x DIMM slot supporting DDR3 1066 MHz
  - Supports up to 4 GB memory size

- **Graphics**
  - Integrated VIA Chrome™ 9 HC3 3D/2D AGP graphics
  - MPEG2, WMV9/VC1, H.264 Full HD video decoder
  - DirectX 9 support

- **Onboard Peripherals**
  - **Serial ATA**
    - 2 SATA connectors
    - Supports up to 3 Gb/s
  - **Onboard LAN**
    - VIA VT6130 PCIe Gigabit Ethernet controller
  - **Onboard LVDS**
    - VIA VT1636 LVDS transmitter
  - **Onboard Audio**
    - VIA VT1708S High Definition Audio Codec
  - **Onboard Super I/O**
    - Fintek F81865F-I Super I/O controller
    - Supports up to four COM ports

- **Onboard I/O Connectors**
  - 2 x USB 2.0 pin headers for 4 USB ports
  - 2 x SATA 2.0 HDD connectors
  - 1 x Front audio pin header for Line-Out and MIC-In
  - 1 x Front panel pin header
  - 1 x PS/2 Keyboard and Mouse pin header
  - 1 x Digital I/O (GPI x 4 + GPO x 4)
  - 1 x CPU fan connector
  - 1 x System fan connector
  - 3 x COM pin headers by F81865-I, with 5V/12V select
  - 5 x COM pin headers by F81865-I, with 5V/12V select (available only for VB7009-12XC)
  - 1 x PCI slot
  - 1 x Dual-channel LVDS connector (18/24 bit)
  - 1 x LVDS inverter pin header
  - 1 x LPC pin header
  - 1 x SPDIF connector
  - 1 x SPI pin header
  - 1 x SMBus pin header
  - 1 x Temperature Sensor pin header
  - 1 x Clear CMOS jumper
  - 1 x COM2 voltage selector jumper
  - 1 x COM3 and COM4 voltage selector jumper
  - 1 x COM5 and COM6 voltage selector jumper (available only for VB7009-12XC)
  - 1 x SATA DOM voltage select jumper
  - 1 x LVDS panel power selector jumper (5V/3.3V)
  - 1 x LVDS inverter power selector jumper (5V/12V)
  - 1 x Buzzer
  - 1 x ATX (20-pin) power connector

- **Back Panel I/O**
  - 1 x VGA port
  - 1 x COM port
  - 1 x Parallel port
  - 2 x RJ45 (GigaLAN) port
  - 4 x USB 2.0 ports
  - 1 x PS/2 Keyboard port
  - 1 x PS/2 Mouse port
  - 3 x Audio jacks: Line-In, Line-Out, MIC-In (Vertical, Smart 5.1 support)

- **BIOS**
  - Award BIOS
  - 8 Mbit SPI flash memory

- **Supported Operating System**
  - Windows 7
  - Windows Embedded Standard 7
  - Windows Embedded POSReady 7
  - Windows Embedded Standard
  - Windows XP
  - Windows CE
  - Linux

- **System Monitoring & Management**
  - Wake-on-LAN
  - Wake-on-Keyboard
  - Wake-on-Mouse
  - RTC Timer to Power On
  - AC power failure recovery

- **Operating Conditions**
  - **Operating Temperature**
    - 0°C up to 60°C
  - **Operating Humidity**
    - 0% ~ 95% (relative humidity; non-condensing)

- **Form Factor**
  - Mini-ITX
  - 17 cm x 17 cm

- **Compliance**
  - CE
  - FCC
  - RoHS

Notes:

1. The VB7009-16 and VB7009-12XC SKUs uses heatsink with fan.
2. The VB7009-10E SKU uses heatsink only.

1.3. Layout Diagram

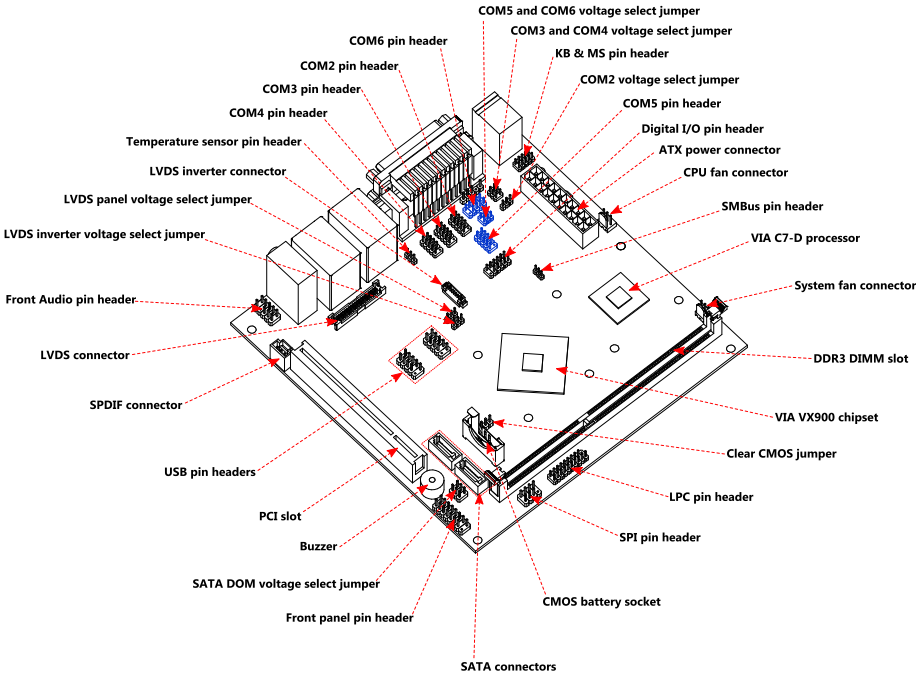


Figure 1: Layout diagram of the VB7009 mainboard (top view)

Notes:

The additional COM pin headers labeled "COM5" and "COM6" are available only in VB7009-12XC SKU.

1.4. Product Dimensions

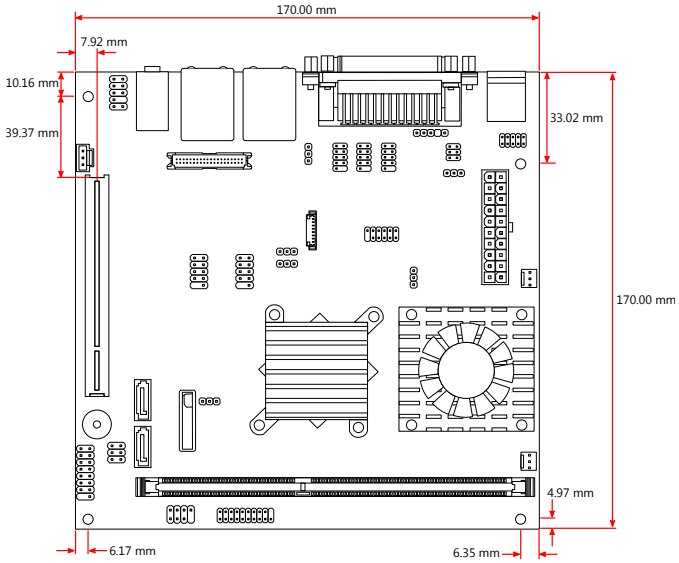


Figure 2: Mounting holes and dimensions of the VB7009 mainboard

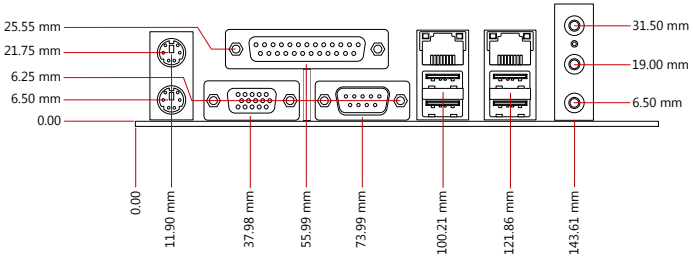


Figure 3: External I/O port dimensions of the VB7009 mainboard

1.5. Height Distribution

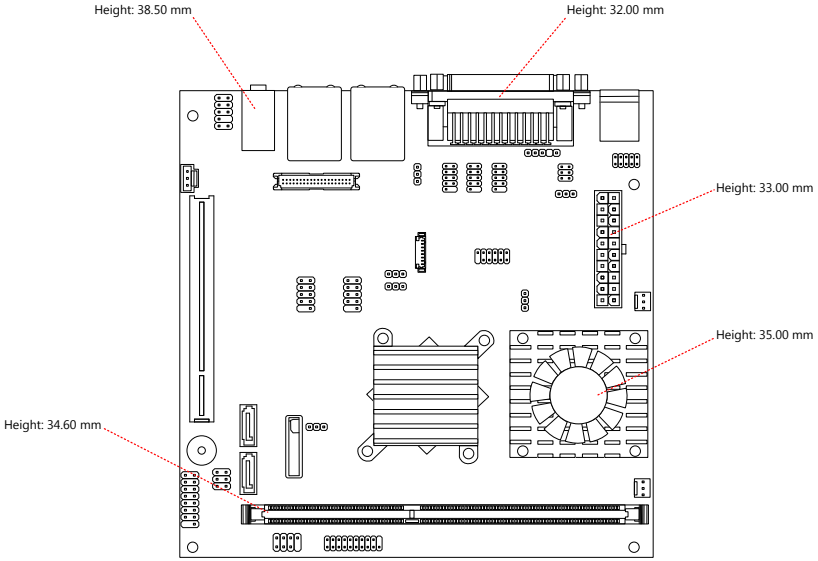


Figure 4: Height distribution of the VB7009 mainboard

2. I/O Interface

The VIA VB7009 has a wide selection of interfaces integrated into the board. It includes a selection of frequently used ports as part of the external I/O coastline.

2.1. External I/O Ports

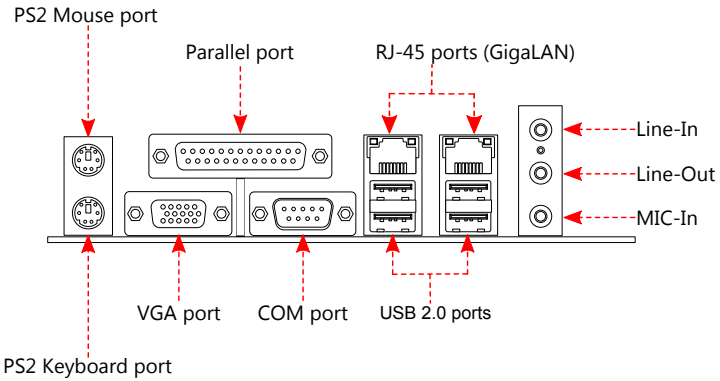


Figure 5: External I/O ports

2.1.1. PS/2 Port

The mainboard has two integrated PS/2 ports for keyboard and mouse. Each port is using the 6-pin Mini-DIN connector. The color purple is use for a PS/2 keyboard while the color green is use for a PS/2 mouse. The pinout of the PS/2 port are shown below.

Pin	Signal
1	Data
2	NC
3	GND
4	+5V
5	Clock
6	NC

Table 1: PS/2 port pinout

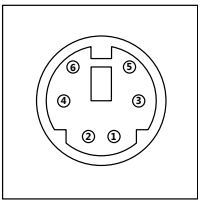


Figure 6: PS/2 port pinout diagram

2.1.2. VGA Port

The integrated 15-pin VGA port uses a female DE-15 connector. The VGA port is for connecting to analog displays. The pinout of the VGA port is shown below.

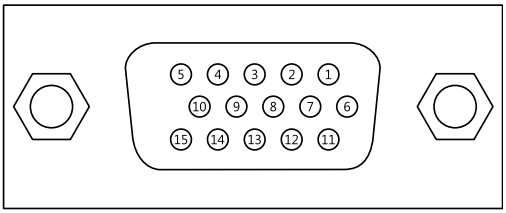


Figure 7: VGA port pinout diagram

Pin	Signal	Pin	Signal
1	VGA-R	9	+5V
2	VGA-G	10	GND
3	VGA-B	11	NC

4	NC	12	VGA-SPD
5	GND	13	VGA_HS
6	GND	14	VGA_VS
7	GND	15	VGA-SPCLK
8	GND		

Table 2: VGA port pinout

2.1.3. COM Port

The integrated 9-pin COM port uses a male DE-9 connector. The COM (COM1) port supports the RS-232 standard. The pinout of the COM port is shown below.

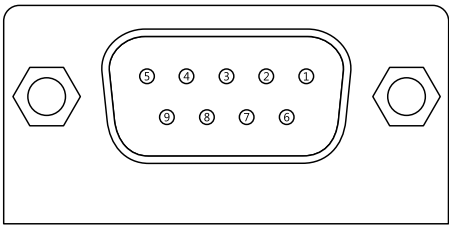


Figure 8: COM port pinout diagram

Pin	Signal	Pin	Signal
1	RIN11/-DCD1	6	RIN21/-DSR1
2	RIN31/SIN1	7	DOUT11/-RTS1
3	DOUT21/SOUT1	8	RIN41/-CTS1
4	DOUT31/-DTR1	9	-XRI1/-RI1
5	GND		

Table 3: COM port pinout

2.1.4. Parallel Port

The integrated 25-pin parallel port uses a female DB-25 connector. A parallel port is a standard printer port that supports Enhanced Parallel Port (EPP) and Extended Capabilities Parallel Port (ECP) modes. The pinout of the Parallel port is shown below.

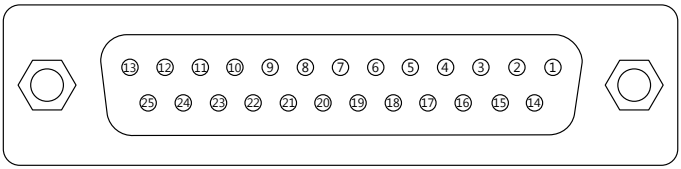


Figure 9: Parallel port pinout diagram

Pin	Signal	Pin	Signal
1	-LPSTB	2	LPD0
3	LPD1	4	LPD2
5	LPD3	6	LPD4
7	LPD5	8	LPD6
9	LPD7	10	-LPACK
11	LPBUSY	12	LPPE
13	LPSLCT	14	-LPAFD
15	-LPERR	16	-LPINIT
17	-LPSLIN	18	GND
19	GND	20	GND
21	GND	22	GND
23	GND	24	GND
25	GND		

Table 4: Parallel port pinout

2.1.5. RJ45 LAN port: Gigabit Ethernet

The two integrated 8-pin Gigabit Ethernet ports are using an 8 Position 8 Contact (8P8C) receptacle connector (commonly referred to as RJ45). The Gigabit Ethernet ports are controlled by VIA Gigabit Ethernet controller. The pinout of the Gigabit Ethernet port is shown below.

Pin	Signal
1	Signal pair 1+
2	Signal pair 1-
3	Signal pair 2+
4	Signal pair 3+
5	Signal pair 3-
6	Signal pair 2-
7	Signal pair 4+
8	Signal pair 4-

Table 5: Gigabit Ethernet port pinout

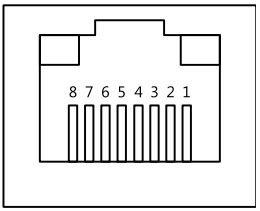


Figure 10: Gigabit Ethernet port pinout diagram

The RJ-45 port has two individual LED indicators located on the front side to show its Active/Link status and Speed status.

	Link LED (Left LED on RJ-45 connector)	Active LED (Right LED on RJ-45 connector)
Link Off	Off	Off
Speed_10Mbit	The LED is always On and flashing in colors Green and Orange	Flash in Yellow color
Speed_100Mbit	The LED is always On in Green color	Flash in Yellow color
Speed_1000Mbit	The LED is always On in Orange color	Flash in Yellow color

Table 6: Gigabit Ethernet LED color definition

2.1.6. USB 2.0 Port

There are four integrated USB 2.0 ports located below the two RJ45 LAN port at the external I/O panel. The USB 2.0 interface port gives complete Plug and Play and hot swap capability for external devices and it complies with USB UHCI, rev. 2.0. Each USB port is using the USB Type A receptacle connector. The pinout of the typical USB port is shown below.

Pin	Signal
1	+5VSUS
2	Data-
3	Data+
4	GND

Table 7: USB 2.0 port pinout

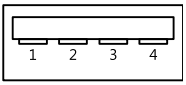


Figure 11: USB port pinout diagram

2.1.7. Audio Ports

There are three audio jack receptacles integrated into a single stack on the I/O coastline. Each receptacle can fit a 3.5 mm Tip Ring Sleeve (TRS) connector to enable connections to Line-Out Line-In, and MIC-in. The Line-Out jack is for connecting to external speakers or headphones. The Line-In jack is for connecting an external audio devices such as CD player, tape player and etc.. The MIC-In jack is for connecting to a microphone.

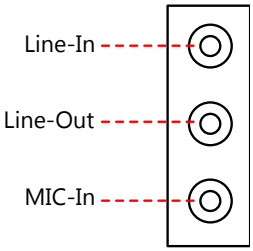


Figure 12: Audio jack receptacle stack

Wiring	Line-In	Line-Out	MIC-In
Tip	Left channel in	Left channel	Left channel
Ring	Right channel in	Right channel	Right channel
Sleeve	Ground	Ground	Ground

Table 8: Audio jack receptacle pinout

2.2. Onboard Connectors

2.2.1. ATX Power Connector

The mainboard has a 20-pin ATX power connector onboard. The ATX power connector is labeled as "ATX_POWER1". The pinout of the ATX power connector is shown below.

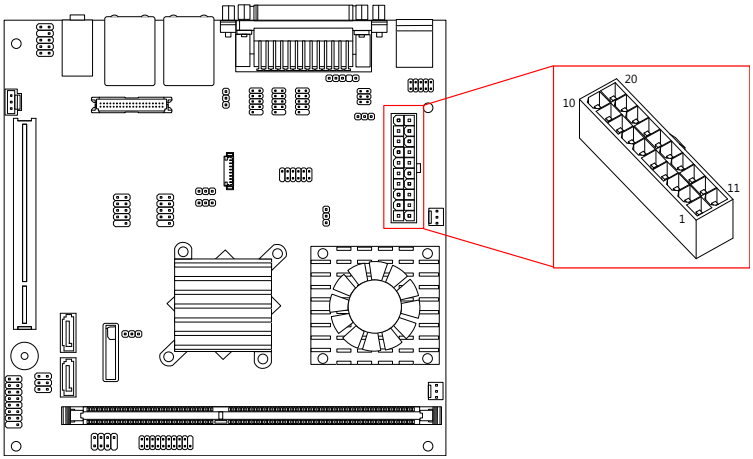


Figure 13: ATX power connector

Pin	Signal	Pin	Signal
1	+3.3V	11	+3.3V
2	+3.3V	12	-12V
3	GND	13	GND
4	+5V	14	Power Supply On
5	GND	15	GND
6	+5V	16	GND
7	GND	17	GND
8	Power OK	18	NC
9	+5VSUS	19	+5V
10	+12V	20	+5V

Table 9: ATX power connector pinout

2.2.2. CMOS Battery Slot

The mainboard is equipped with a CMOS battery slot, which is compatible with CR2032 coin batteries. The CMOS battery slot is labeled as "BAT2". When inserting a CR2032 coin battery, be sure that the positive side is facing the locking clip.

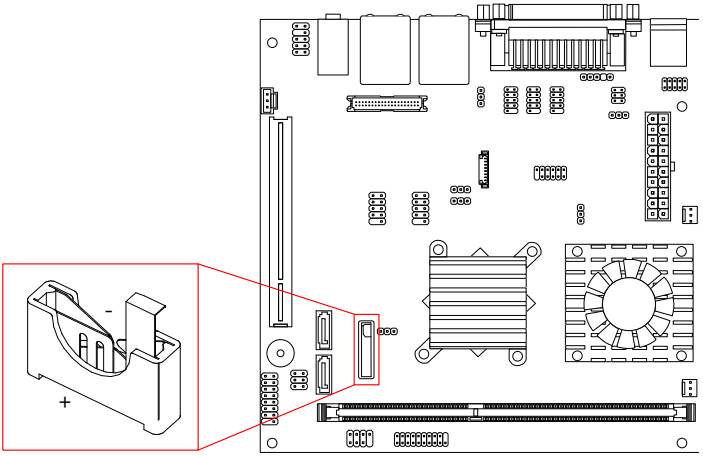


Figure 14: CMOS battery slot

Pin	Signal
1	GND
2	+3V
3	GND

Table 10: CMOS battery slot pinout

2.2.3. Front Panel Pin Header

The front panel pin header consists of 15 pins in a 16-pin block. Pin 15 is keyed. The front panel pin header is labeled as "F_PANEL1". It provides access to system LEDs, power, reset, system speaker and HDD LED. The pinout of the front panel pin header is shown below.

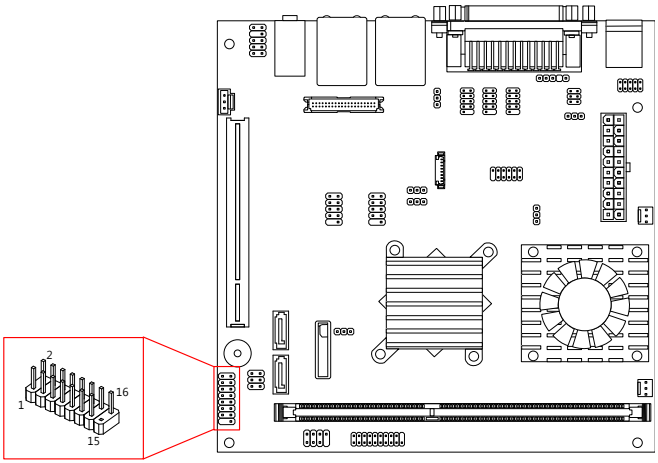


Figure 15: Front panel pin header

Pin	Signal	Pin	Signal
1	+5VDUAL	2	+5V
3	+5VDUAL	4	SATA_LED
5	PWR_LED	6	PWR_BTN
7	+5V	8	GND
9	NC	10	-RST_SW
11	NC	12	GND
13	SPEAK	14	+5V
15	Key	16	-SLEEP_LED

Table 11: Front panel pin header pinout

2.2.4. Front Audio Pin Header

In addition to the TRS audio jacks on the external I/O coastline, the mainboard has a pin header for Line-Out and MIC-In. The pin header is labeled as "F_AUDIO1". The pinout of the pin header is shown below.

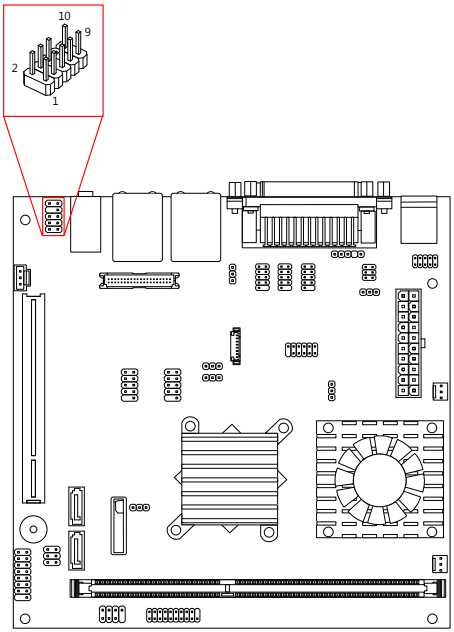


Figure 16: Front audio pin header

Pin	Signal	Pin	Signal
1	MIC2IN_L	2	AGND
3	MIC2IN_R	4	AGND
5	HPOUTR	6	MIC2_JD
7	F_AUDIO_SENSE	8	Key
9	HPOUTL	10	HPOUT_JD

Table 12: Front audio pin header pinout

2.2.5. SMBus Pin Header

The SMBus pin header consists of three pins that allow connecting the SMBus devices. Devices communicate with a SMBus host and/or other SMBus devices using the SMBus interface. It is labeled as "SMBUS1". The pinout of the SMBus pin header is shown below.

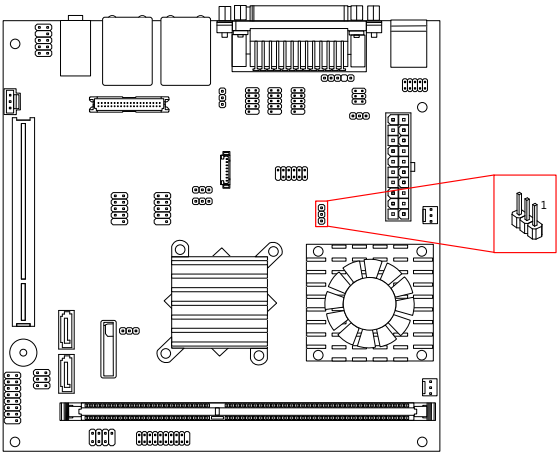


Figure 17: SMBus pin header pinout

Pin	Signal
1	SMB_CK
2	SMB_DT
3	GND

Table 13: SMBus pin header

2.2.6. CPU and System Fan Connectors

There are two fan connectors on board: one for the CPU and one for the chassis. The fan connector for the CPU is labeled as "CPUFAN1" and the fan connector for the system is labeled as "SYSFAN1". The fans provide variable fan speeds controlled by the BIOS. The pinout of the fan connectors is shown below.

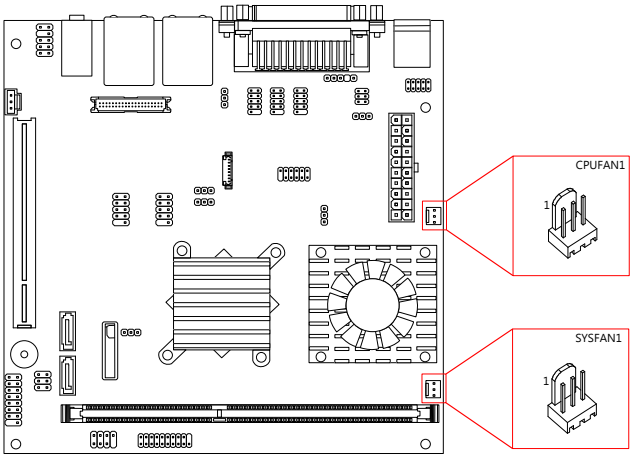


Figure 18: Fan connectors

CPU fan (CPUFAN1)	
Pin	**Signal**
1	F_IO2 / Fan speed detection
2	F_PWM2 / Fan speed control
3	GND
System fan (SYSFAN1)	
Pin	**Signal**
1	F_IO1 / Fan speed detection
2	F_PWM1 / Fan speed control
3	GND

Table 14: Fan connector pinouts

2.2.7. SATA Connectors

The two SATA connectors on board can support up to 3 Gb/s transfer speeds, enabling fast data file transfer with independent DMA operation. The SATA connectors are labeled as "SATA1" and "SATA2". The pinout of the SATA connectors are as shown below.

SATA1	
Pin	**Signal**
1	GND
2	STXP_0
3	STXN_0
4	GND
5	SRXN_0
6	SRXP_0
7	GND/+5V

SATA2	
Pin	**Signal**
1	GND
2	STXP_1
3	STXN_1
4	GND
5	SRXN_1
6	SRXP_1
7	GND/+5V

Table 15: SATA connector pinouts

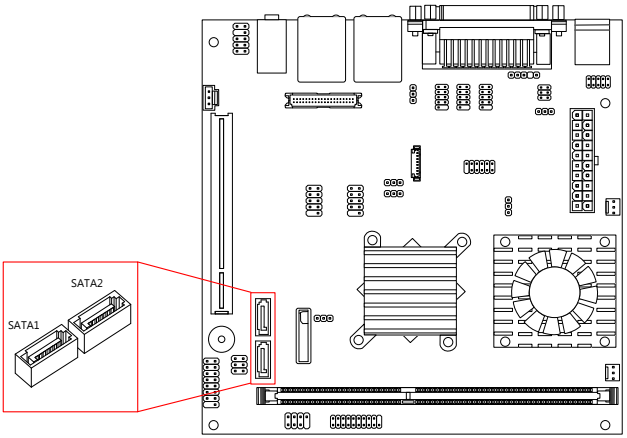


Figure 19: SATA connectors

Note:

SATA connector pin 7:

1. GND is for SATA HDD (default setting).
2. +5V is for SATA DOM. To enable the +5V on pin 7, set the SATA DOM voltage select jumper.

2.2.8. USB 2.0 Pin Headers

The mainboard has two USB 2.0 pin headers blocks that support up to four USB 2.0 ports. The pin header blocks are labeled as USB_4, and "USB_5". The pinout of the USB pin headers are shown below.

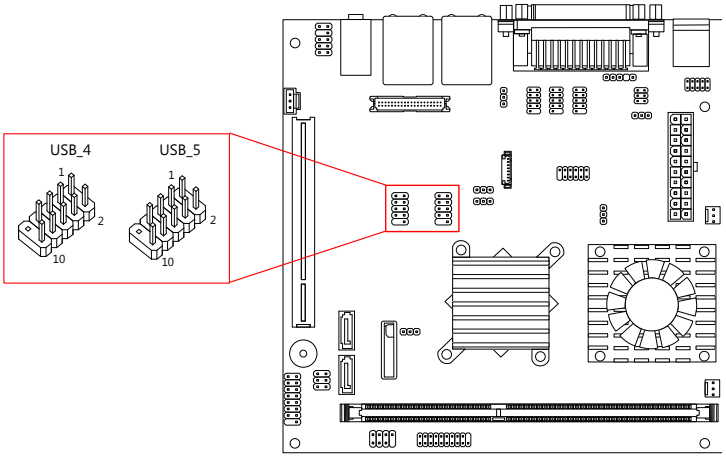


Figure 20: USB 2.0 pin headers

USB_4			
Pin	Signal	Pin	Signal
1	+5VDUAL	2	+5VDUAL
3	USBD_T1-	4	USBD_T0-
5	USBD_T1+	6	USBD_T0+
7	GND	8	GND
9	Key	10	GND

USB_5			
Pin	Signal	Pin	Signal
1	+5VDUAL	2	+5VDUAL
3	USBD_T6-	4	USBD_T7-
5	USBD_T6+	6	USBD_T7+
7	GND	8	GND
9	Key	10	GND

Table 16: USB 2.0 pin header pinouts

2.2.9. COM Pin Headers

There are COM pin headers on the mainboard in addition to the COM port 1 on the external I/O. Each COM pin header supports the RS-232 standard. The COM pin headers labeled as "COM2, COM3 and COM4" are available in VB7009-16 and VB7009-10E SKUs, while the additional "COM5" and "COM6" pin headers are offered only in VB7009-12XC SKU. All of the COM pin headers can support +5V or +12V. See page 37 for details on setting the voltage. The pinout of the COM pin headers are shown below.

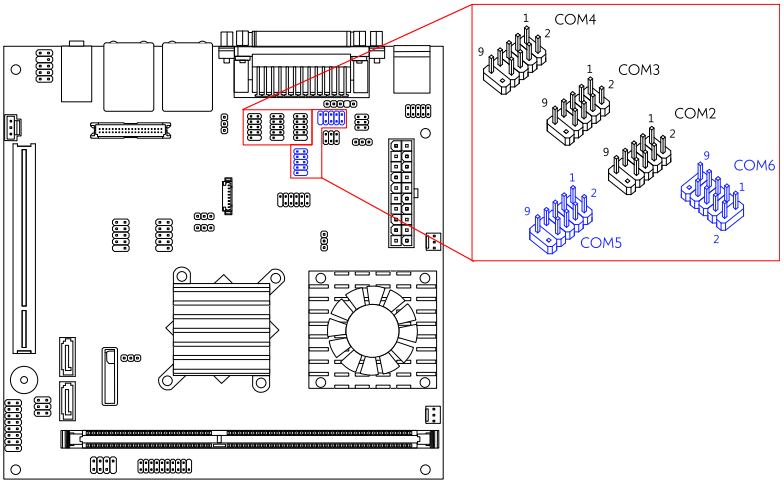


Figure 21: COM pin header

Pin	Signal	Pin	Signal
1	COM_DCD	2	COM_RXD
3	COM_TXD	4	COM_DTR
5	GND	6	COM_DSR
7	COM_RTS	8	COM_CTS
9	COM_RI	10	Key

Table 17: COM pin header pinout

2.2.10. PS/2 Keyboard and Mouse Pin Header

The mainboard has a pin header for a PS/2 keyboard and mouse. The pin header is labeled as "JKB/MS1". The pinout of the pin header is shown below.

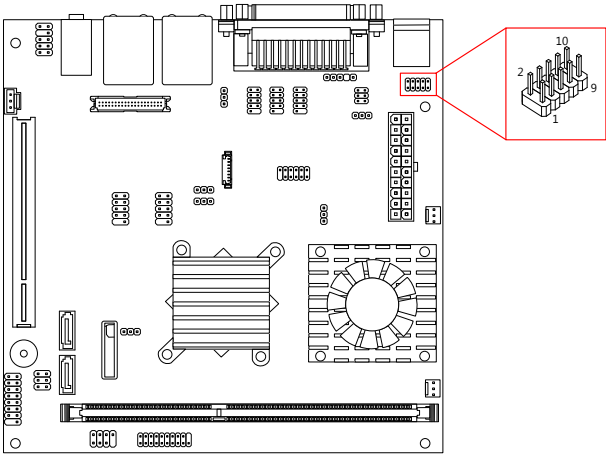


Figure 22: PS/2 keyboard and mouse pin header

Pin	Signal	Pin	Signal
1	+5VDUAL	2	GND
3	KB_CLK	4	KB_DATA
5	EKBCLK	6	EKBDATA
7	MS_CLK	8	MS_DATA
9	EMSCLK	10	EMSDATA

Table 18: PS/2 keyboard and mouse pin header pinout

Note:

When the pin header is not in use, please short pin 3&5, pin 4&6, pin 7&9 and pin 8&10

2.2.11. LVDS Connector

The mainboard has one 40-pin LVDS connector on the bottom side. The LVDS connector is labeled as "PANEL_CONN1". The pinout of the connector is shown below.

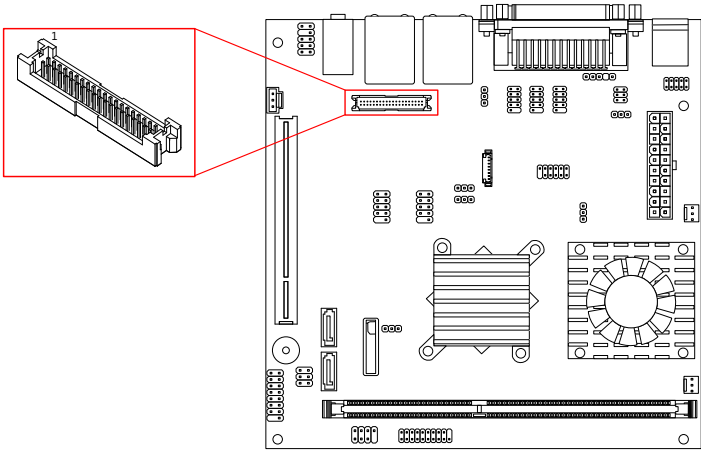


Figure 23: LVDS connector

Pin	Signal	Pin	Signal
1	-A4_L	2	PVDD
3	A4_L	4	PVDD
5	GND	6	GND
7	-A5_L	8	GND
9	A5_L	10	-A0_L
11	GND	12	A0_L
13	-A6_L	14	GND
15	A6_L	16	-A1_L
17	GND	18	A1_L
19	-CLK2_L	20	GND
21	CLK2_L	22	-A2_L
23	GND	24	A2_L
25	-A7_L	26	GND
27	A7_L	28	-CLK1_L
29	NC	30	CLK1_L
31	NC	32	GND

33	NC	34	-A3_L
35	NC	36	A3_L
37	NC	38	SPCLK1
39	NC	40	SPD1

Table 19: LVDS connector pinout

2.2.12. Inverter Connector

The mainboard has one Inverter connector on the bottom side. The Inverter connector is labeled as "INVERTER1". The pinout of the connector is shown below.

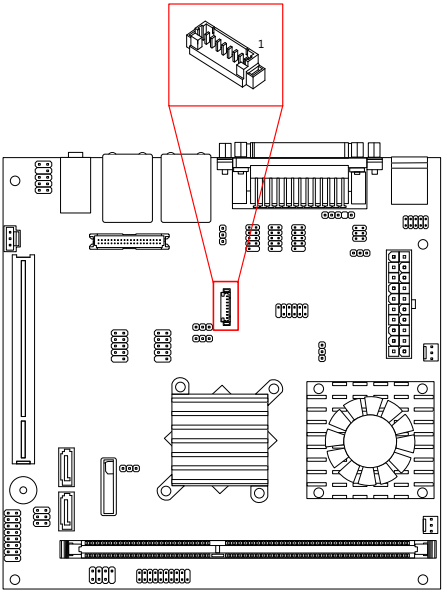


Figure 24: Inverter connector

Pin	Signal
1	IVDD
2	IVDD
3	BAKLITE_EN
4	LVDS_PWM
5	BAKLITE_EN
6	LVDS_DA
7	GND
8	GND

Table 20: Inverter connector pinout

2.2.13. SPDIF Connector

The mainboard has one 3-pin SPDIF (Sony Philips Digital Interface) connector. The SPDIF output provides digital audio to external speakers or compressed AC3 data to an external Dolby Digital Decoder. The connector is labeled as "SPDIF". The pinout of the connector is shown below.

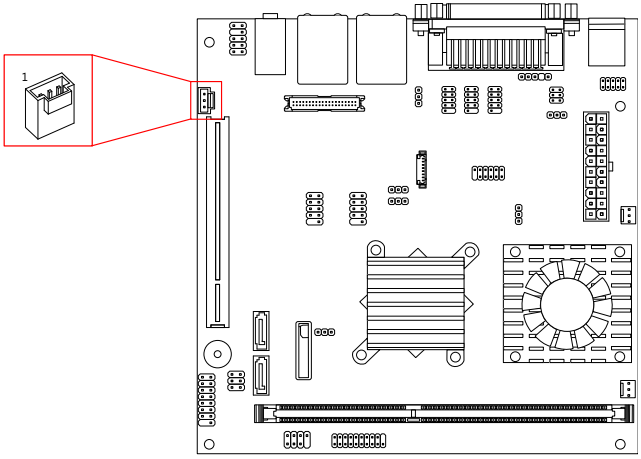


Figure 25: SPDIF connector

Pin	Signal
1	+5V
2	SPDIFO
3	GND

Table 21: SPDIF connector pinout

2.2.14. SPI Pin Header

The mainboard has one 8-pin SPI pin header. The SPI (Serial Peripheral Interface) pin-header is used to connect to the SPI BIOS programming fixture. The pin header is labeled as "SPI1". The pinout of the pin header is shown below.

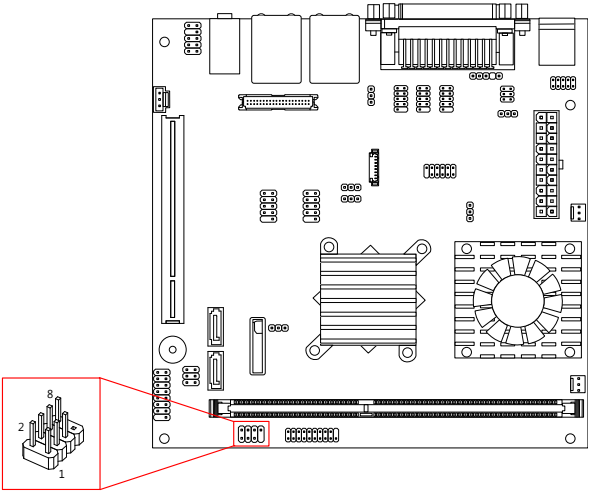


Figure 26: SPI pin header

Pin	Signal	Pin	Signal
1	SPIVCC	2	GND
3	MSPISS0	4	MSPICLK
5	MSPIDI	6	MSPIDO
7	key	8	-PCIRST

Table 22: SPI pin header pinout

2.2.15. LPC Pin Header

The mainboard has one LPC pin header for connecting LPC devices. The pin header is labeled as "LPC1". The pinout of the pin header is shown below.

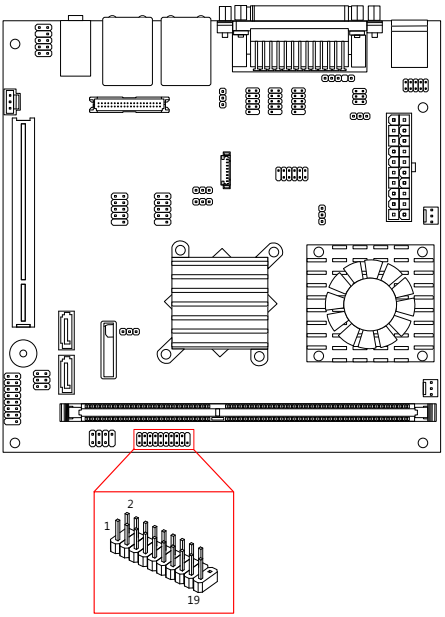


Figure 27: LPC pin header

Pin	Signal	Pin	Signal
1	LPCAD1	2	LPC33CLK
3	-LPCRST	4	GND
5	LPCAD0	6	LPC48CLK
7	LPCAD2	8	-LPCFRAME
9	SERIRQ	10	LPCAD3
11	-LPCDRQ1	12	-EXTSMI
13	+5V	14	+3.3V
15	+5V	16	+3.3V
17	GND	18	GND
19	GND	20	Key

Table 23: LPC pin header pinout

2.2.16. Digital I/O Pin Header

The onboard Digital I/O pin header supports up to four GPO and four GPI signals. The pin header is labeled as "DIO1". The pinout of the pin headers are shown below.

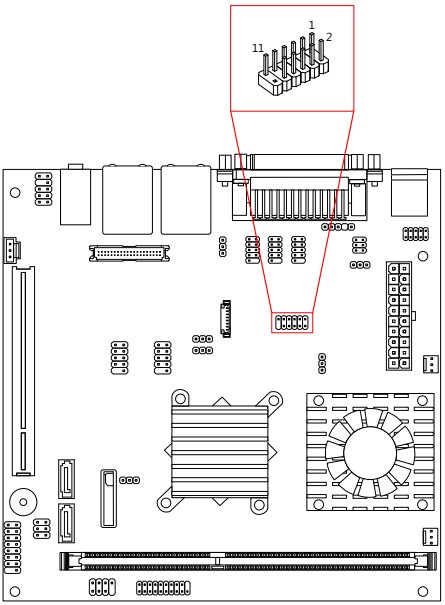


Figure 28: Digital I/O pin header

Pin	Signal	Pin	Signal
1	+5V	2	+12V
3	GPO_23	4	GPI_03
5	GPO_22	6	GPI_02
7	GPO_21	8	GPI_01
9	GPO_20	10	GPI_00
11	GND	12	Key

Table 24: Digital I/O pin header pinout

2.2.17. Temperature Sensor Pin Header

The mainboard supports a pin header (3-pin) that allows the connection of a temperature sensor cable for detecting the system's internal air temperature. The temperature reading can be seen in the BIOS Setup Utility. The pin header is labeled as "J5". The pin out of the temperature sensor pin header is shown below.

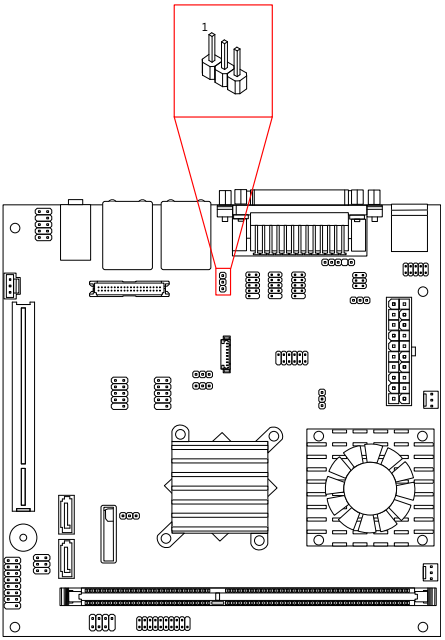


Figure 29: Temperature sensor pin header

Pin	Signal
1	TMPIN2
2	TMPIN2
3	HWMGND

Table 25: Temperature sensor pin header pinout

3. Jumpers

3.1. Clear CMOS Jumper

The onboard CMOS RAM stores system configuration data and has an onboard battery power supply. To reset the CMOS settings, set the jumper on pins 2 and 3 while the system is off. Return the jumper to pins 1 and 2 afterwards. Setting the jumper while the system is on will damage the mainboard. The default setting is on pins 1 and 2.

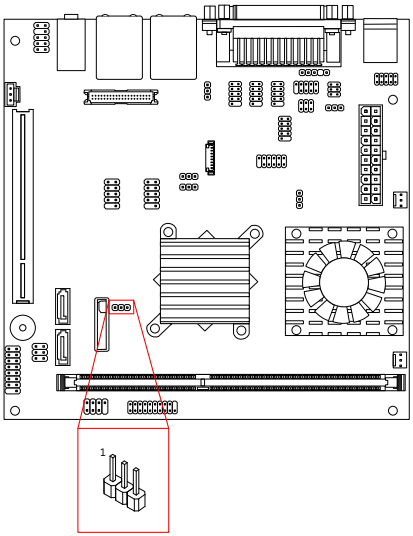


Figure 30: CLEAR CMOS jumper

Setting	Pin 1	Pin 2	Pin 3
Regular (default)	On	On	Off
Clear CMOS	Off	On	On

Table 26: CLEAR CMOS jumper settings

Note:

Except when clearing the RTC RAM, never remove the cap from the CLEAR_CMOS jumper default position. Removing the cap will cause system boot failure. Avoid clearing the CMOS while the system is on; it will damage the mainboard.

3.2. COM Voltage Select Jumpers

Each of the additional COM ports (available through the onboard COM pin headers, see page 25) can support both +5V and +12V. COM2 has its own pin header block. COM3 and COM4 share a single pin header block. COM5 and COM6 also share a single pin header block.

3.2.1. COM2 Voltage Select Jumper

The voltage for COM2 is controlled by the jumper labeled as "J12". The voltage can be either +5V or +12V. +5V is the default setting. The jumper settings are shown below.

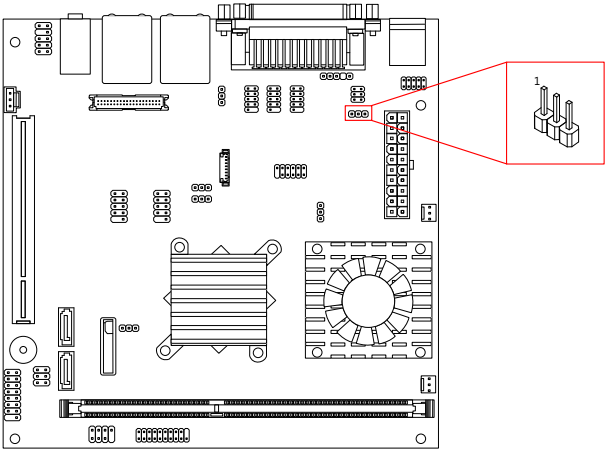


Figure 31: COM2 voltage select jumper

Setting	Pin 1	Pin 2	Pin 3
+5V (default)	On	On	Off
+12V	Off	On	On

Table 27: COM2 voltage select jumper settings

3.2.2. COM3 and COM4 Voltage Select Jumper

The voltage for COM3 and COM4 is controlled by the jumper labeled as "J13". Refer to Figure 32 for the location of the jumper.

The voltage can be either +5V or +12V. +5V is the default setting. The even pin numbers correspond to COM3. The odd pin numbers correspond to COM4. The jumper settings are shown below.

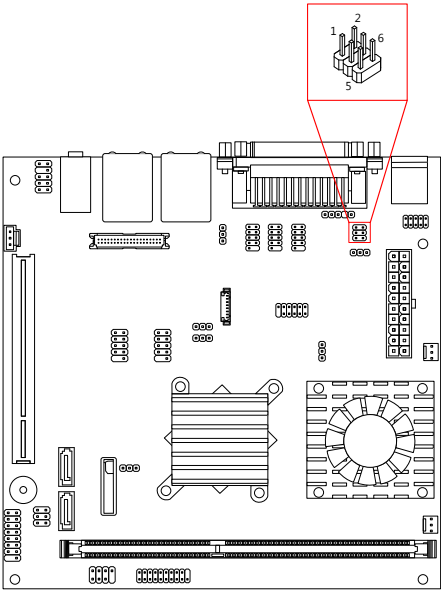


Figure 32: Voltage select jumpers for COM3 and COM4

COM4 Setting	Pin 1	Pin 3	Pin 5
+5V (default)	On	On	Off
+12V	Off	On	On
COM3 Setting	**Pin 2**	**Pin 4**	**Pin 6**
+5V (default)	On	On	Off
+12V	Off	On	On

Table 28: Jumper settings for COM3 and COM4

3.2.3. COM5 and COM6 Voltage Select Jumper

The voltage for COM5 and COM6 is controlled by the jumper labeled as "J14". Refer to Figure 33 for the location of the jumper.

The voltage can be either +5V or +12V. +5V is the default setting. The even pin numbers correspond to COM5. The odd pin numbers correspond to COM6. The jumper settings are shown below.

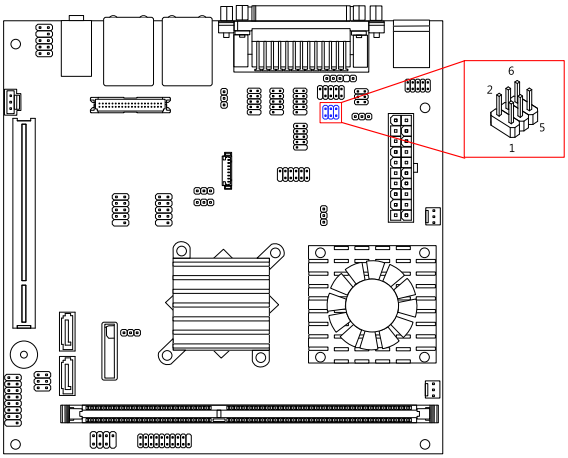


Figure 33: Voltage select jumpers for COM5 and COM6

COM6 Setting	Pin 1	Pin 3	Pin 5
+5V (default)	On	On	Off
+12V	Off	On	On
COM5 Setting	**Pin 2**	**Pin 4**	**Pin 6**
+5V (default)	On	On	Off
+12V	Off	On	On

Table 29: Jumper settings for COM5 and COM6

Note:

If the mainboard is not equipped with COM5 and COM6, then the J14 jumper will not be on the mainboard either.

3.3. SATA DOM Voltage Select Jumper

The SATA connectors (see page 23) can be used to support Disk-on-Module (DOM) flash drives. When the jumpers are set, +5V will be delivered to the 7th pin of the SATA connectors. The pin jumper is labeled as "J2". The jumper settings are shown below.

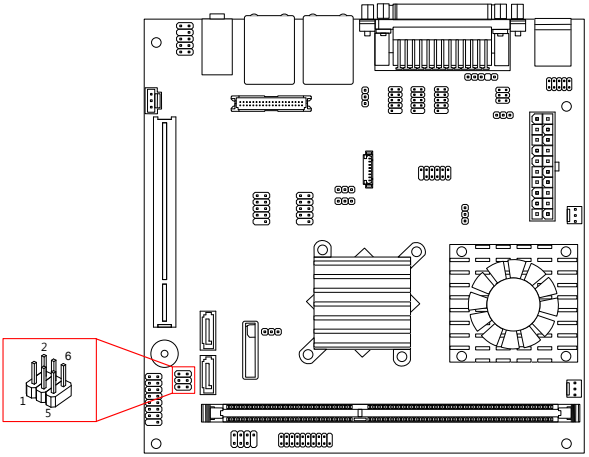


Figure 34: SATA DOM voltage select jumper

SATA1 Setting	Pin 1	Pin 3	Pin 5
DOM support	On	On	Off
Regular (default)	Off	On	On
SATA2 Setting	**Pin 2**	**Pin 4**	**Pin 6**
DOM support	On	On	Off
Regular (default)	Off	On	On

Table 30: SATA DOM voltage select jumper settings

Note:

The default settings of "SATA DOM Voltage Select Jumper": short pin 3&5 and pin 4&6

3.4. Panel Power Select Jumper

The mainboard has a jumper that controls the voltage delivered to the LVDS panel connector. The jumper is labeled as "PVDD1". The jumper settings are shown below.

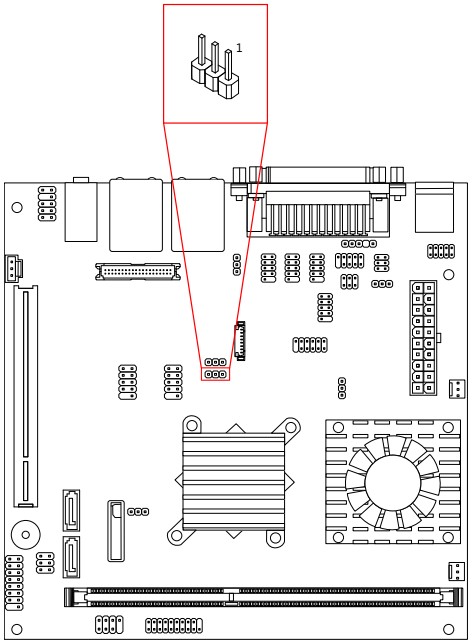


Figure 35: LVDS power select jumper

Panel Voltage	Pin 1	Pin 2	Pin 3
+5V	On	On	Off
+3.3V (default)	Off	On	On

Table 31: LVDS power select jumper settings

3.5. Backlight Power Select Jumper

The mainboard has a jumper that controls the input voltage delivered to the LVDS inverter connector. The jumper is labeled as "IVDD_SEL1". The jumper settings are shown below.

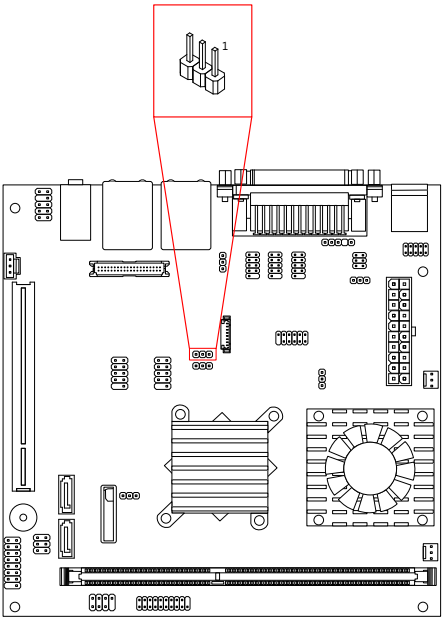


Figure 36: Backlight power select jumper

Panel Voltage	Pin 1	Pin 2	Pin 3
+5V	On	On	Off
+12V (default)	Off	On	On

Table 32: Backlight power select jumper settings

4. Expansion Slots

4.1. DDR3 Memory Slots

The mainboard provide one DDR3 DIMM memory slot. The memory slot can accommodate up to 4 GB of 1066 MHz memory. The memory slot is labeled as "DIMM1". The location of the DDR3 memory slot is shown below.

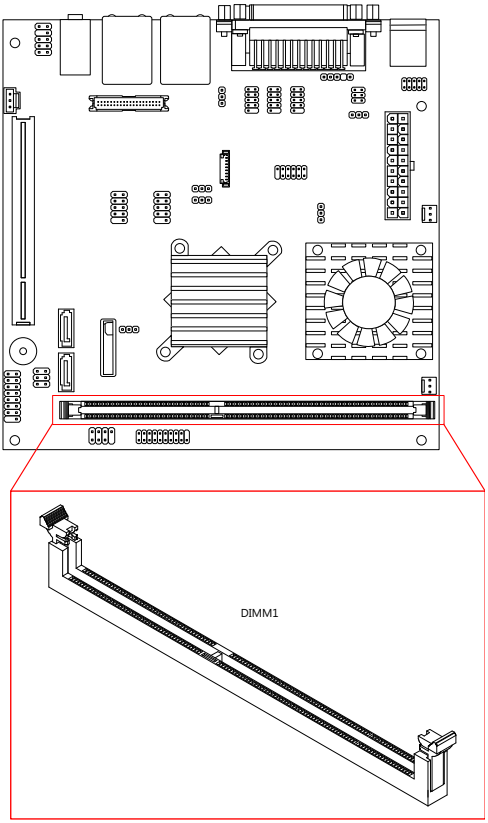


Figure 37: DDR3 memory slots

4.1.1. Installing a Memory Module

Step 1

Disengage the locking mechanism at both ends of the DIMM slot by pressing the retaining clips outward.

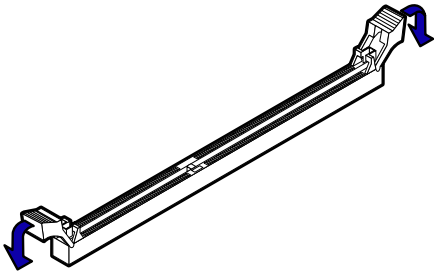


Figure 38: Unlocking the memory DIMM slot

Step 2

Align the notch on the DIMM memory module with the counter part on the DIMM slot.

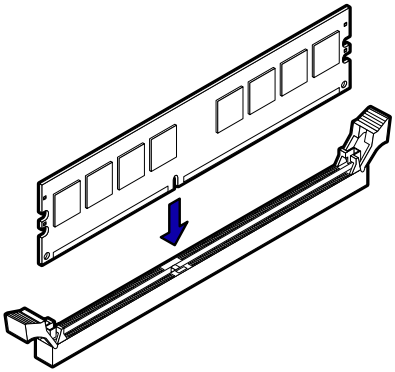


Figure 39: Inserting the memory module

Step 3

Insert the DIMM memory module into the slot and push down at both ends until the locking clips lock the DIMM memory module into place.

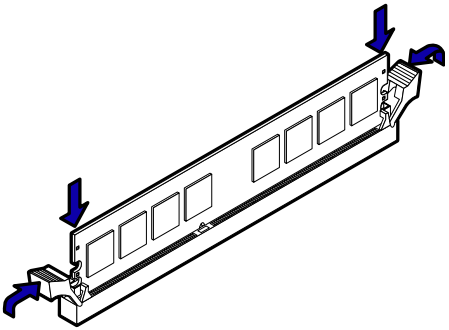


Figure 40: Locking the memory module

4.1.2. Removing a Memory Module

Step 1

To disengage the locking clips, push outward the locking clips on both ends of memory slot. When the locking clips have cleared, the DIMM memory module will automatically pop up. Remove the memory module.

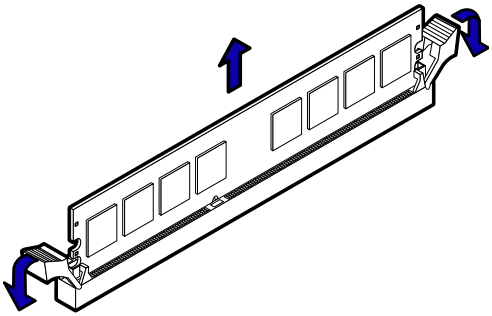


Figure 41: Removing the memory module

4.1.3. PCI Slot

The onboard PCI slot, labeled as "PCI_SLOT1", supports 5V 32-bit PCI cards. It is not compatible with PCI cards requiring 3.3V signaling. The location of the PCI slot is shown below.

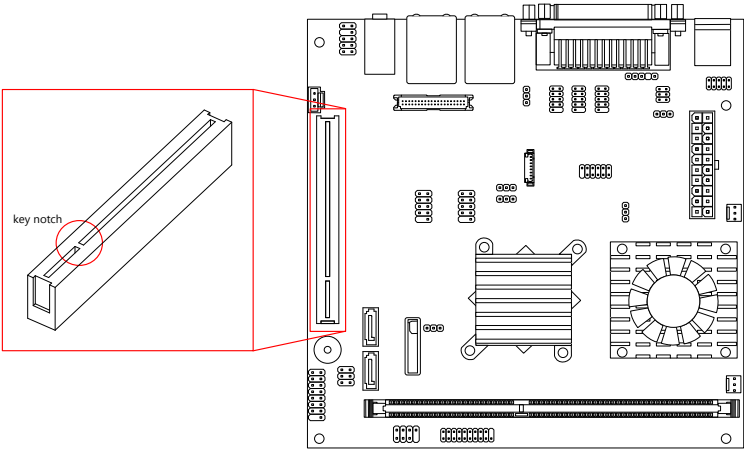


Figure 42: PCI slot

Note:
1. The orientation of PCI card can be changed from vertical to horizontal using a riser card module.
2. When adding or removing expansion card, unplug first the power supply.

5. Hardware Installation

5.1. Installing into a Chassis

The VB7009 can be fitted into any chassis that has the mounting holes for compatible with the standard Mini-ITX mounting hole locations. Additionally, the chassis must meet the minimum height requirements for specified areas of the mainboard. If a riser card module is being used, the chassis will need to accommodate the additional space requirements.

5.1.1. Suggested minimum chassis dimensions

The figure below shows the suggested minimum space requirements that a chassis should have in order to work well with the VB7009.

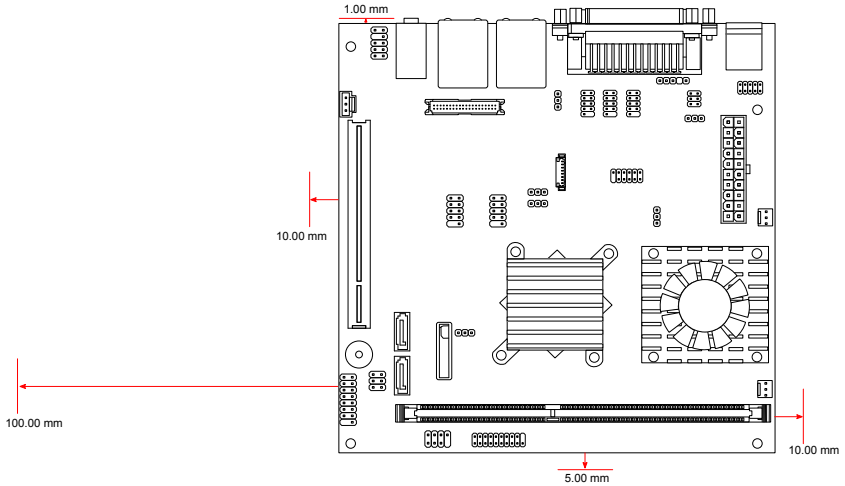


Figure 43: Suggested minimum chassis dimensions

Each side of the mainboard should have a buffer zone from the internal wall of the chassis. The side of the mainboard that accommodates the I/O coastline should have a buffer of 1.00 mm. The side on the opposite end of the I/O

coastline should have a buffer of at least 5.00 mm. The two sides adjacent to the I/O coastline should have at least a 10.00 mm buffer.

For the side that is close to the PCI slot, the buffer should be at least 100.00 mm if a riser card module will be used.

5.1.2. Suggested minimum chassis height

The figure below shows the suggested minimum height requirements for the internal space of the chassis. It is not necessary for the internal ceiling to be evenly flat. What is required is that the internal ceiling height must be strictly observed for each section that is highlighted. The highest part of the ceiling will be above the PCI slot.

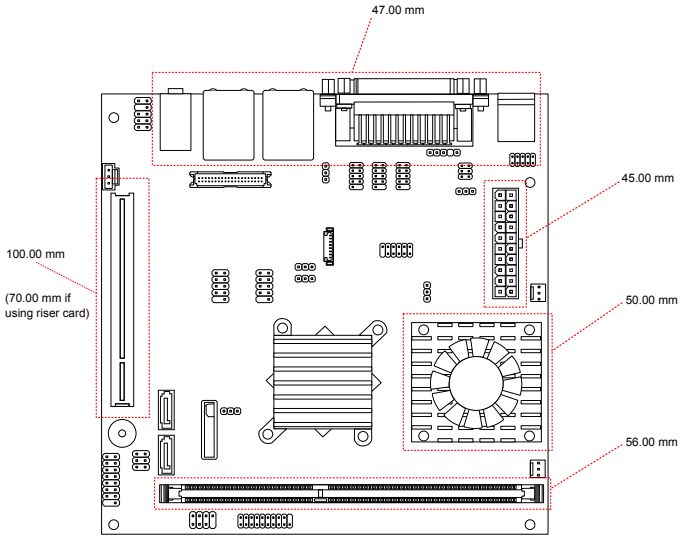


Figure 44: Suggested minimum internal chassis ceiling height

5.1.3. Suggested keepout areas

The figure below shows the areas of the mainboard that is highly suggested to leave unobstructed.

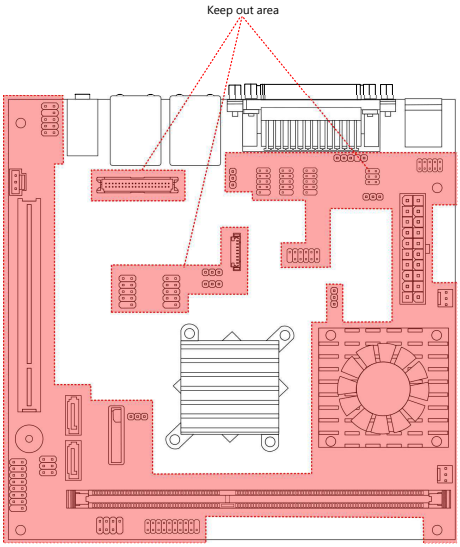


Figure 45: Suggested keepout areas

6. BIOS Setup Utility

6.1. Entering the BIOS Setup Utility

Power on the computer and press **Delete** during the beginning of the boot sequence to enter the BIOS Setup Utility. If the entry point has passed, restart the system and try again.

6.2. Control Keys

Up Move up one row

Down Move down one row

Left Move to the left in the navigation bar

Right Move to the right in the navigation bar

Enter Access the highlighted item / Select the item

Esc Jumps to the Exit screen or returns to the previous screen

Page up / +[1] Increase the numeric value

Page down / -[1] Decrease the numeric value

F1 General help[2]

F5 Restore the previous CMOS value

F7 Load optimized defaults

F10 Save all the changes and exit

Note:

1. Must be pressed using the 10-key pad.
2. The General help contents are only for the Status Page and Option Page setup menus.

6.3. Navigating the BIOS Menus

The main menu displays all the BIOS setup categories. Use the <**Left**>/<**Right**> and <**Up**>/<**Down**> arrow keys to select any item or sub-menu. Descriptions of the selected/highlighted category are displayed at the bottom of the screen.

The small triangular arrowhead symbol next to a field indicates that a sub-menu is available (see figure below). Press <**Enter**> to display the sub-menu. To exit the sub-menu, press <**Esc**>.

6.4. Getting Help

The BIOS Setup Utility provides a "**General Help**" screen. This screen can be accessed at any time by pressing **F1**. The help screen displays the keys for using and navigating the BIOS Setup Utility. Press **Esc** to exit the help screen.

6.5. Main Menu

The Main Menu contains thirteen setup functions and two exit choices. Use arrow keys to select the items and press <**Enter**> to accept or enter Sub-menu.

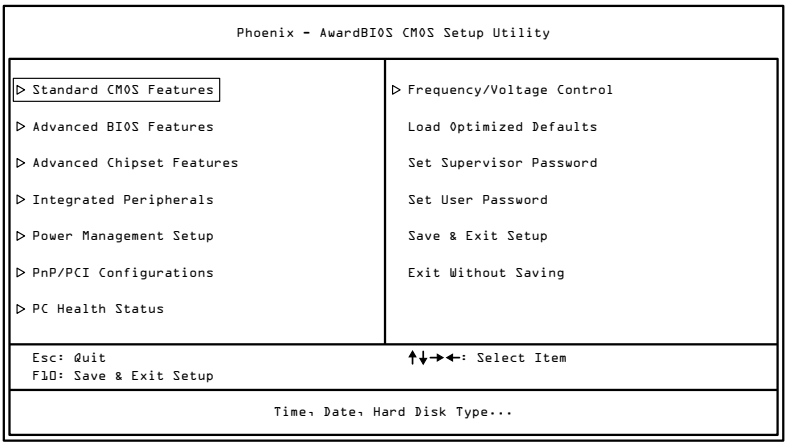


Figure 46: Illustration of the Main menu screen

6.5.1. Standard CMOS Features

Use this menu to set basic system configurations.

6.5.2. Advanced BIOS Features

Use this menu to set the advanced features available on your system.

6.5.3. Advanced Chipset Features

Use this menu to set chipset specific features and optimize system performance.

6.5.4. Integrated Peripherals

Use this menu to set onboard peripherals features.

6.5.5. Power Management Setup

Use this menu to set onboard power management functions.

6.5.6. PnP/PCI Configurations

Use this menu to set the PnP and PCI configurations.

6.5.7. PC Health Status

This menu shows the PC health status.

6.5.8. Frequency/Voltage Control

Use this menu to set the system frequency and voltage control.

6.5.9. Load Optimized Defaults

Use this menu option to load BIOS default settings for optimal and high performance system operations.

6.5.10. Set Supervisor Password

Use this menu option to set the BIOS supervisor password.

6.5.11. Set User Password

Use this menu option to set the BIOS user password.

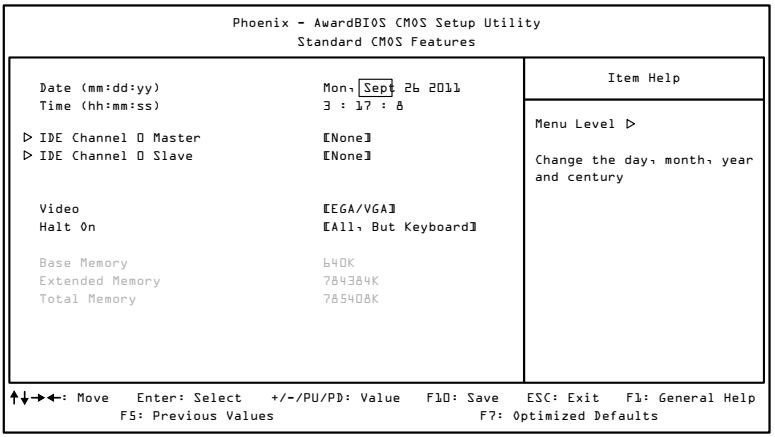
6.5.12. Save & Exit Setup

Save BIOS setting changes and exit setup.

6.5.13. Exit Without Saving

Discard all BIOS setting changes and exit setup

6.6. Standard CMOS Features



6.6.1. Date

The date format is [Day, Month Date, Year]

6.6.2. Time

The time format is [Hour : Minute : Second]

6.6.3. Video

Settings: [EGA/VGA, CGA 40, CGA 80, MONO]

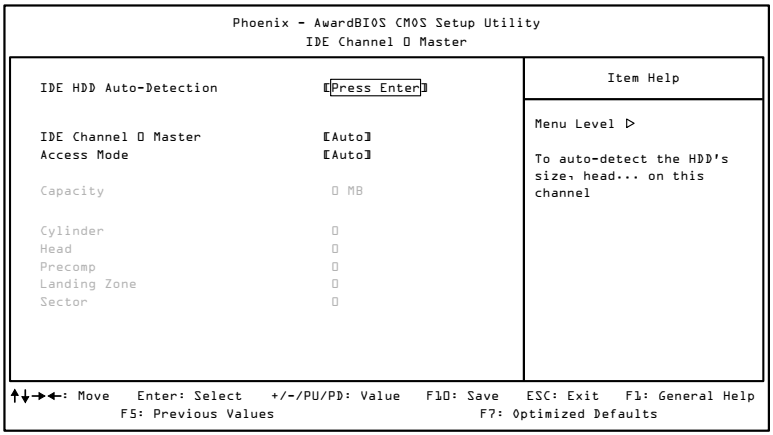
6.6.4. Halt On

Set the system's response to specific boot errors. Below is a table that details the possible settings.

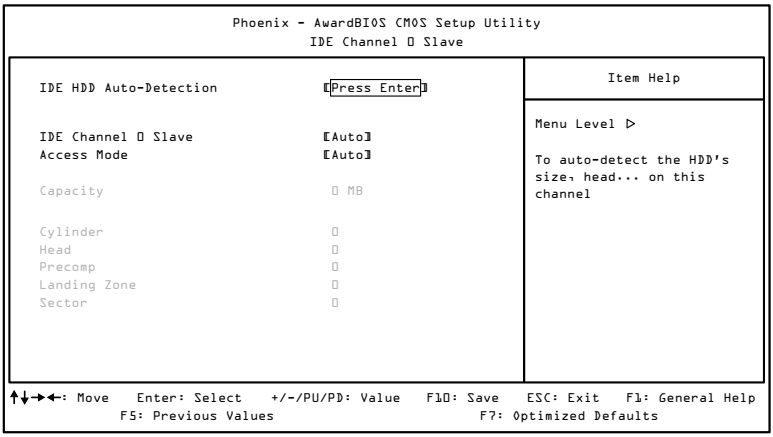
Settings	Description
All Errors	System halts when any error is detected
No Errors	System does not halt for any error
All, But Keyboard	System halts for all non-key errors

6.7. IDE Channels

Channel 0 Master



Channel 0 Slave

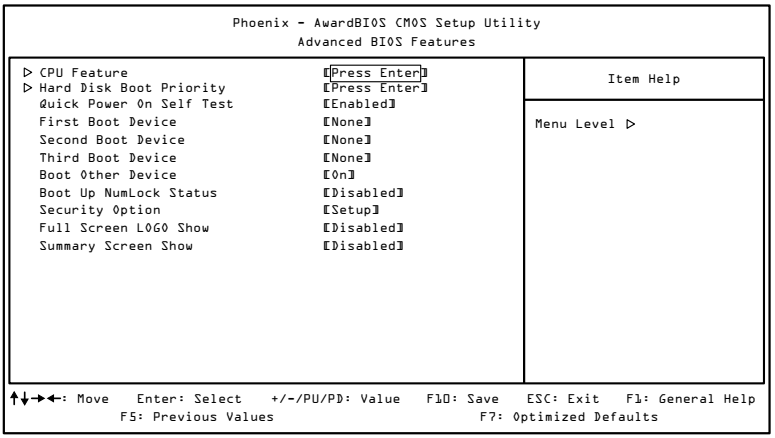


The specifications of your drive must match with the drive table. The hard disk will not work properly if you enter incorrect information in this category. Select **"Auto"** whenever possible. If you select **"Manual"**, make sure the information is from your hard disk vendor or system manufacturer.

Below is a table that details required hard drive information when using the **"Manual"** mode.

Settings	Description
[storage] Channel	The name of this match the name of the menu. Settings: [None, Auto, Manual]
Access Mode	Settings: [CHS, LBA, Large, Auto]
Capacity	Formatted size of the storage device
Cylinder	Number of cylinders
Head	Number of heads
Precomp	Write precompensation
Landing Zone	Cylinder location of the landing zone
Sector	Number of sectors

6.8. Advanced BIOS Features


Phoenix - AwardBIOS CMOS Setup Utility
Advanced BIOS Features
▷ CPU Feature [Press Enter]
▷ Hard Disk Boot Priority [Press Enter]
Quick Power On Self Test [Enabled]
First Boot Device [None]
Second Boot Device [None]
Third Boot Device [None]
Boot Other Device [On]
Boot Up NumLock Status [Disabled]
Security Option [Setup]
Full Screen LOGO Show [Disabled]
Summary Screen Show [Disabled]
Item Help
Menu Level ▷
↑↓→←: Move Enter: Select +/-/PU/PD: Value F10: Save ESC: Exit F1: General Help
F5: Previous Values F7: Optimized Defaults

The Advanced BIOS Features section includes the following submenus:

- ☐ CPU Feature
- ☐ Hard Disk Boot Priority

6.8.1. Quick Power On Self-Test

Shortens Power On Self-Test (POST) cycle to enable shorter boot up time.

Settings	Description
Disabled	Standard Power On Self Test (POST)
Enabled	Shorten Power On Self Test (POST) cycle and boot up time

6.8.2. First/Second/Third Boot Device

Set the boot device sequence as BIOS attempts to load the disk operating system.

Settings	Description
Removable	Boot from external drive
Hard Disk	Boot from the HDD
CDROM	Boot from CDROM
Legacy LAN	Boot from network drive

VIA Networking	Boot from network drive
Disabled	Disable the boot device sequence

6.8.3. Boot Other Device

Enables the system to boot from alternate devices if the system fails to boot from the "First/Second/Third Boot Device" lists.

Settings	Description
Disabled	No alternate boot device allowed
Enabled	Enable alternate boot device

6.8.4. Boot Up NumLock Status

Set the NumLock status when the system is powered on.

Settings	Description
Off	Forces keypad to behave as arrow keys
On	Forces keypad to behave as 10-key

6.8.5. Security Option

Selects whether the password is required every time the System boots, or only when you enter Setup.

Settings	Description
Setup	Password prompt appears only when end users try to run BIOS Setup
System	Password prompt appears every time when the computer is powered on and when end users try to run BIOS Setup

6.8.6. Full Screen Logo Show

Show full screen logo during BIOS boot up process.

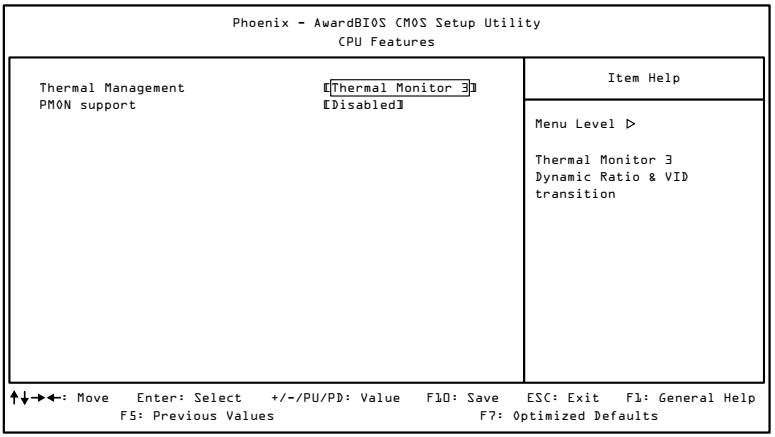
Settings: [Disabled, Enabled]

6.8.7. Summary Screen Show

Show summary screen.

Settings: [Disabled, Enabled]

6.9. CPU Feature



6.9.1. Thermal Management

This item sets CPU's thermal control rule to protect CPU from overheating.

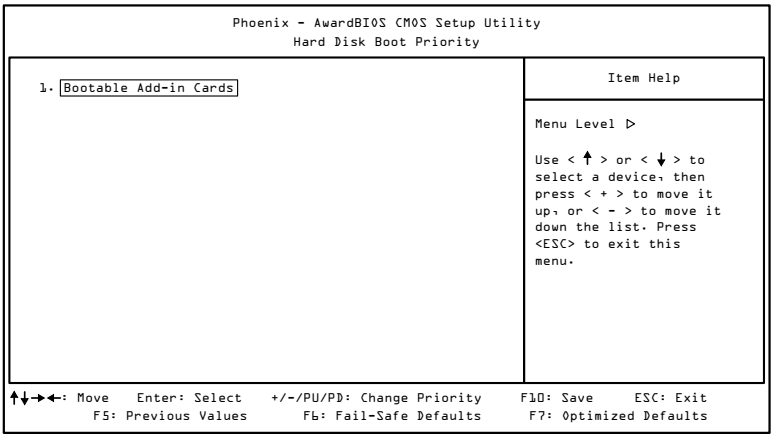
Settings	Description
Thermal Monitor 3	Dynamic Ratio & VID Transition
Disabled	Disable this feature

6.9.2. PMON support

This feature controlled the CPU speed to perform automatically at best performance to comply with the given system applications.

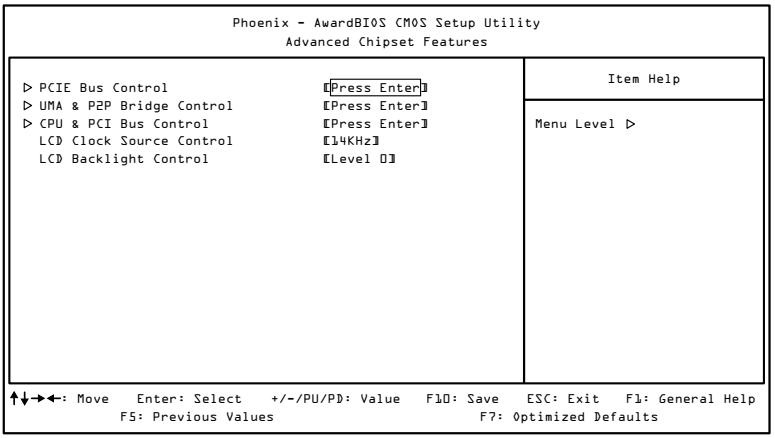
Settings	Description
Disabled	Turn off this feature.
Auto	Automatically control the CPU speed to perform at best performance.

6.10. Hard Disk Boot Priority


Phoenix - AwardBIOS CMOS Setup Utility
Hard Disk Boot Priority
1. Bootable Add-in Cards
Item Help
Menu Level ▷
Use < ↑ > or < ↓ > to select a device, then press < + > to move it up, or < - > to move it down the list. Press <ESC> to exit this menu.
↑↓→←: Move Enter: Select +/-/PU/PD: Change Priority F10: Save ESC: Exit
F5: Previous Values F6: Fail-Safe Defaults F7: Optimized Defaults

This is for setting the priority of the hard disk boot order when the "Hard Disk" option is selected in the "[First/Second/Third] Boot Device" menu item.

6.11. Advanced Chipset Features


Phoenix - AwardBIOS CMOS Setup Utility
Advanced Chipset Features
▷ PCIE Bus Control [Press Enter]
▷ UMA & P2P Bridge Control [Press Enter]
▷ CPU & PCI Bus Control [Press Enter]
LCD Clock Source Control [14KHz]
LCD Backlight Control [Level 0]
Item Help
Menu Level ▷
↑↓→←: Move Enter: Select +/-/PU/PD: Value F10: Save ESC: Exit F1: General Help
F5: Previous Values F7: Optimized Defaults

Caution:

The Advanced Chipset Features menu is used for optimizing the chipset functions. Do not change these settings unless you are familiar with the chipset.

The Advanced Chipset Features section includes the following submenus:

- ☐ PCIE Bus Control
- ☐ UMA & P2P Bridge Control
- ☐ CPU & PCI Bus Control

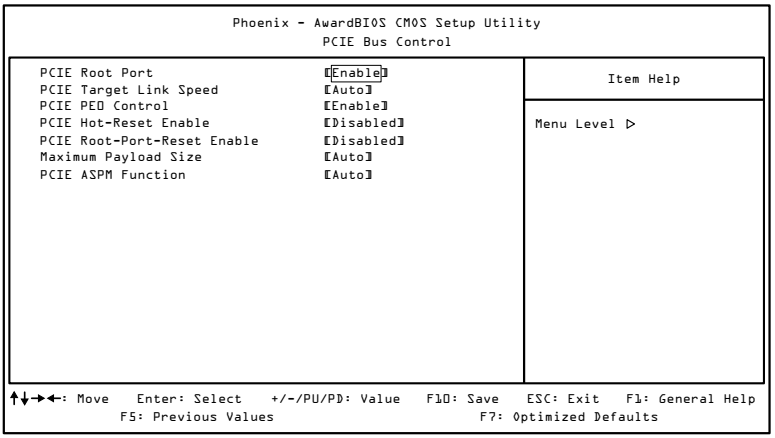
6.11.1. LCD Clock Source Control

Settings: [14 KHz, 7 KHz, 110 Hz, 55 Hz]

6.11.2. LCD Backlight Control

Settings: [Level 0, Level 1, Level 2, Level 3, Level 4, Level 5, Level 6, Level 7, Level 8]

6.12. PCIE Bus Control


Phoenix - AwardBIOS CMOS Setup Utility
PCIE Bus Control
PCIE Root Port [Enable]
PCIE Target Link Speed [Auto]
PCIE PE0 Control [Enable]
PCIE Hot-Reset Enable [Disabled]
PCIE Root-Port-Reset Enable [Disabled]
Maximum Payload Size [Auto]
PCIE ASPM Function [Auto]
Item Help
Menu Level ▷
↑↓→←: Move Enter: Select +/-/PU/PD: Value F10: Save ESC: Exit F1: General Help
F5: Previous Values F7: Optimized Defaults

6.12.1. PCIE Root Port

Settings: [Disabled, Enabled]

6.12.2. PCIE Target Link Speed

Settings: [Auto, Force Gen1]

6.12.3. PCIE PE0 Control

Settings: [Disabled, Enabled]

6.12.4. PCIE Hot-Reset Enable

Settings: [Disabled, Enabled]

6.12.5. PCIE Root-Port-Reset Enable

Settings: [Disabled, Enabled]

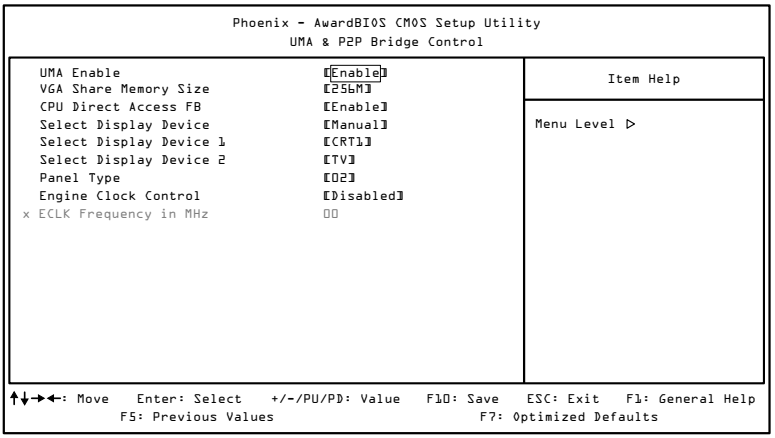
6.12.6. Maximum Payload Size

Settings: [Auto, 128 Byte]

6.12.7. PCIE ASPM Function

Settings: [Force Disable, Auto]

6.13. UMA & P2P Bridge Control


Phoenix - AwardBIOS CMOS Setup Utility
UMA & P2P Bridge Control
UMA Enable [Enable]
VGA Share Memory Size [256M]
CPU Direct Access FB [Enable]
Select Display Device [Manual]
Select Display Device 1 [CRT1]
Select Display Device 2 [TV]
Panel Type [02]
Engine Clock Control [Disabled]
x ECLK Frequency in MHz 00
Item Help
Menu Level ▷
↑↓→←: Move Enter: Select +/-/PU/PD: Value F10: Save ESC: Exit F1: General Help
F5: Previous Values F7: Optimized Defaults

6.13.1. UMA Enable

Settings: [Disabled, Enabled]

6.13.2. VGA Share Memory Size

This setting allows you to select the amount of system memory that is allocated to the integrated graphics processor.

Settings: [64M, 128M, 256M]

6.13.3. CPU Direct Access FB

Settings: [Disabled, Enabled]

6.13.4. Select Display Device

This setting refers to the type of display being used with the system.

Settings: [Auto, Manual]

6.13.5. Select Display Device 1

This setting refers to the type of display device 1 being used with the system.

Settings: [CRT, LCD]

6.13.6. Select Display Device 2

This setting refers to the type of display device 2 being used with the system.

Settings: [CRT, LCD]

6.13.7. Panel Type

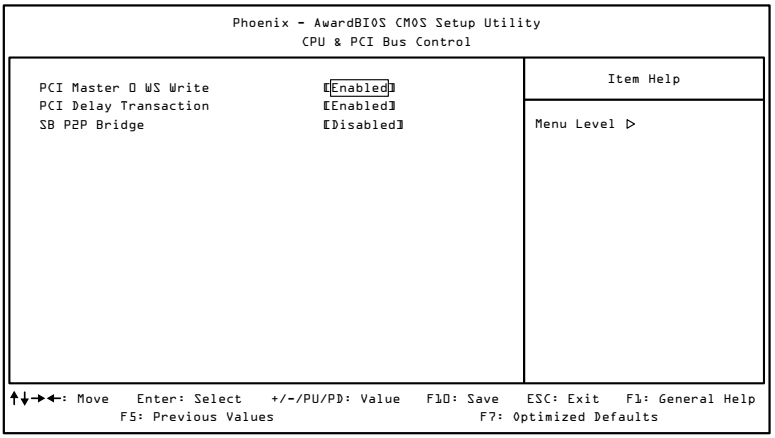
Key in a HEX number.

Settings: [Min = 0000, Max = 0000F]

6.13.8. Engine Clock Control

Settings: [Disabled, Enabled]

6.14. CPU & PCI Bus Control


Phoenix - AwardBIOS CMOS Setup Utility
CPU & PCI Bus Control
PCI Master 0 WS Write [Enabled]
PCI Delay Transaction [Enabled]
SB P2P Bridge [Disabled]
Item Help
Menu Level ▷
↑↓→←: Move Enter: Select +/-/PU/PD: Value F10: Save ESC: Exit F1: General Help
F5: Previous Values F7: Optimized Defaults

6.14.1. PCI Master 0 WS Write

Settings: [Enabled, Disabled]

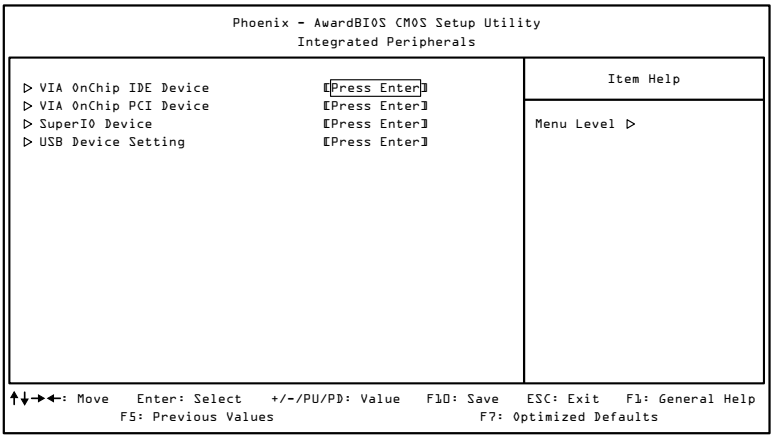
6.14.2. PCI Delay Transaction

Settings: [Disabled, Enabled]

6.14.3. SB P2P Bridge

Settings: [Disabled, Enabled]

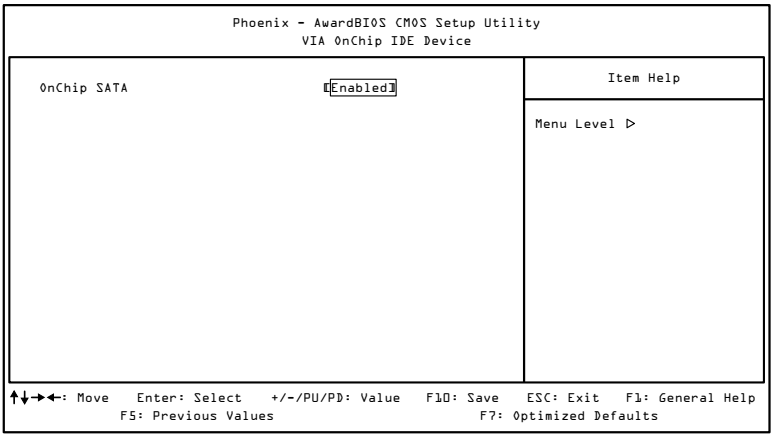
6.15. Integrated Peripherals


Phoenix - AwardBIOS CMOS Setup Utility
Integrated Peripherals
▷ VIA OnChip IDE Device [Press Enter]
▷ VIA OnChip PCI Device [Press Enter]
▷ SuperIO Device [Press Enter]
▷ USB Device Setting [Press Enter]
Item Help
Menu Level ▷
↑↓→←: Move Enter: Select +/-/PU/PD: Value F10: Save ESC: Exit F1: General Help
F5: Previous Values F7: Optimized Defaults

The Integrated Peripherals section includes the following submenus:

- ☐ VIA OnChip IDE Device
- ☐ VIA OnChip PCI Device
- ☐ SuperIO Device
- ☐ USB Device Setting

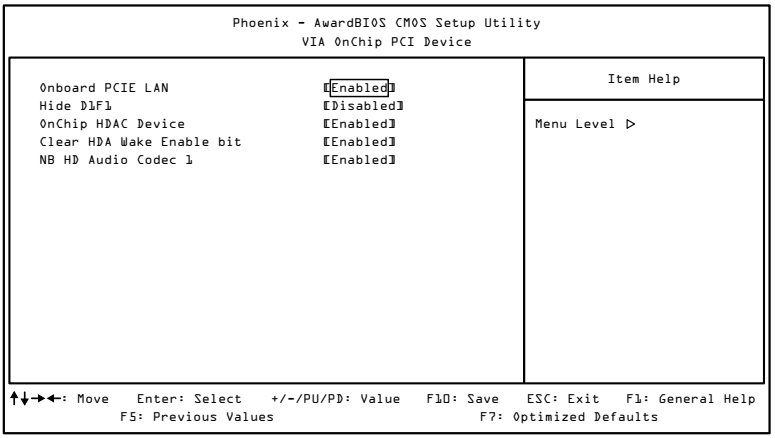
6.16. VIA OnChip IDE Device



6.16.1. OnChip SATA

Settings: [Disabled, Enabled]

6.17. VIA OnChip PCI Device


Phoenix - AwardBIOS CMOS Setup Utility
VIA OnChip PCI Device
Onboard PCIE LAN [Enabled]
Hide D1F1 [Disabled]
OnChip HDAC Device [Enabled]
Clear HDA Wake Enable bit [Enabled]
NB HD Audio Codec 1 [Enabled]
Item Help
Menu Level ▷
↑↓→←: Move Enter: Select +/-/PU/PD: Value F10: Save ESC: Exit F1: General Help
F5: Previous Values F7: Optimized Defaults

6.17.1. Onboard PCIE LAN

Settings: [Enabled, Disabled]

6.17.2. Hide D1F1

Settings: [Enabled, Disabled]

6.17.3. OnChip HDAC Device

Settings: [Enabled, Disabled]

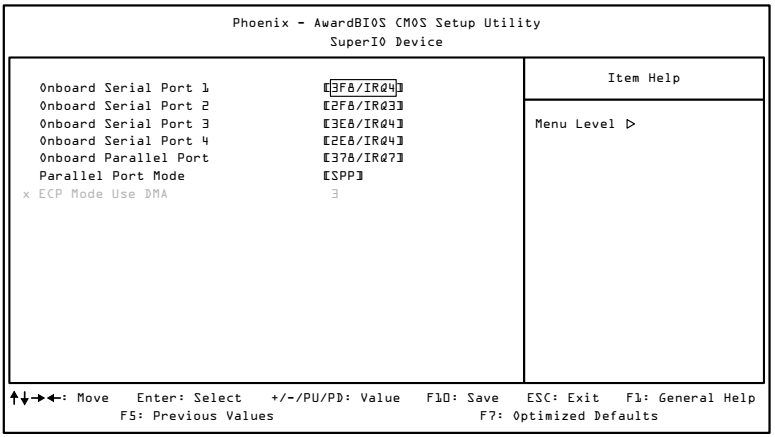
6.17.4. Clear HDA Wake Enable bit

Settings: [Enabled, Disabled]

6.17.5. NB HD Audio Codec 1

Settings: [Enabled, Disabled]

6.18. SuperIO Device


Phoenix - AwardBIOS CMOS Setup Utility
SuperIO Device
Onboard Serial Port 1 [3F8/IRQ4]
Onboard Serial Port 2 [2F8/IRQ3]
Onboard Serial Port 3 [3E8/IRQ4]
Onboard Serial Port 4 [2E8/IRQ4]
Onboard Parallel Port [378/IRQ7]
Parallel Port Mode [SPP]
x ECP Mode Use DMA 3
Item Help
Menu Level ▷
↑↓→←: Move Enter: Select +/-/PU/PD: Value F10: Save ESC: Exit F1: General Help
F5: Previous Values F7: Optimized Defaults

6.18.1. Onboard Serial Ports 1 ~ 4

Set the base I/O port address and IRQ for the onboard serial ports. Selecting "Auto" allows the BIOS to automatically determine the correct base I/O port.

Port	Address	IRQ
1	Disabled, 3F8, 2F8, 3E8, 2E8, 338, 348, Auto	4
2	Disabled, 3F8, 2F8, 3E8, 2E8, 338, 348, Auto	4
3	Disabled, 3F8, 2F8, 3E8, 2E8, 338, 348, Auto	4
4	Disabled, 3F8, 2F8, 3E8, 2E8, 338, 348, Auto	4

6.18.2. Onboard Parallel Port

This specifies the I/O port address and IRQ of the onboard parallel port. Settings: [Disabled, 378/IRQ7, 278/IRQ5, 3BC/IRQ7]

6.18.3. Parallel Port Mode

Set the parallel port mode. To operate the onboard parallel port as Standard Parallel Port, choose SPP. To operate the onboard parallel port in the EPP mode, choose EPP. By choosing ECP, the onboard parallel port will operate in

ECP mode. Choosing ECP + EPP will allow the onboard parallel port to support both the ECP and EPP modes simultaneously.

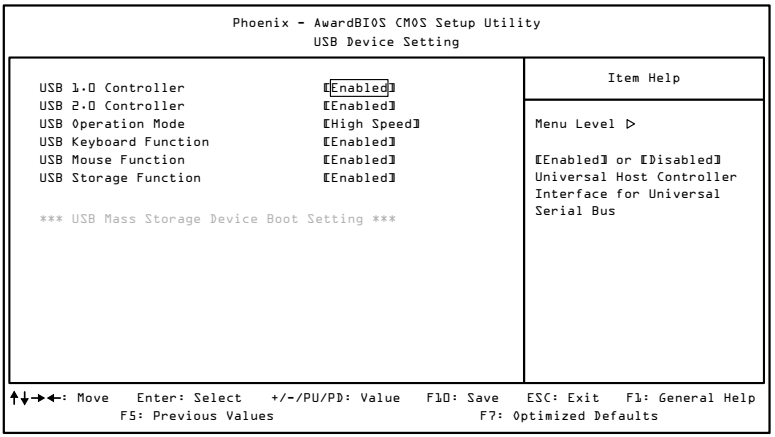
Settings: [SPP, EPP, ECP, ECP + EPP]

6.18.4. ECP Mode Use DMA

ECP (Extended Capabilities Port) has two DMA channels that it can use. The default channel is 3. However, some expansion cards may use channel 3 as well. To solve this conflict, change the ECP channel to 1. Select a DMA channel for the port.

Settings: [1, 3]

6.19. USB Device Setting


Phoenix - AwardBIOS CMOS Setup Utility
USB Device Setting
USB 1.0 Controller [Enabled]
USB 2.0 Controller [Enabled]
USB Operation Mode [High Speed]
USB Keyboard Function [Enabled]
USB Mouse Function [Enabled]
USB Storage Function [Enabled]
*** USB Mass Storage Device Boot Setting ***
Item Help
Menu Level ▷
[Enabled] or [Disabled]
Universal Host Controller Interface for Universal Serial Bus
↑↓→←: Move Enter: Select +/-/PU/PD: Value F10: Save ESC: Exit F1: General Help
F5: Previous Values F7: Optimized Defaults

6.19.1. USB 1.0 Controller

Enable or disable Universal Host Controller Interface for Universal Serial Bus.

Settings: [Disabled, Enabled]

6.19.2. USB 2.0 Controller

Enable or disable Enhanced Host Controller Interface for Universal Serial Bus.

Settings: [Disabled, Enabled]

6.19.3. USB Operation Mode

Auto decide USB device operation mode.

Settings	Description
Full/Low Speed	All of USB Device operated on full/low speed mode
High Speed	If USB device was high speed device, then it operated on high speed mode.

6.19.4. USB Keyboard Function

Enable or disable legacy support of USB keyboard.

Settings: [Disabled, Enabled]

6.19.5. USB Mouse Function

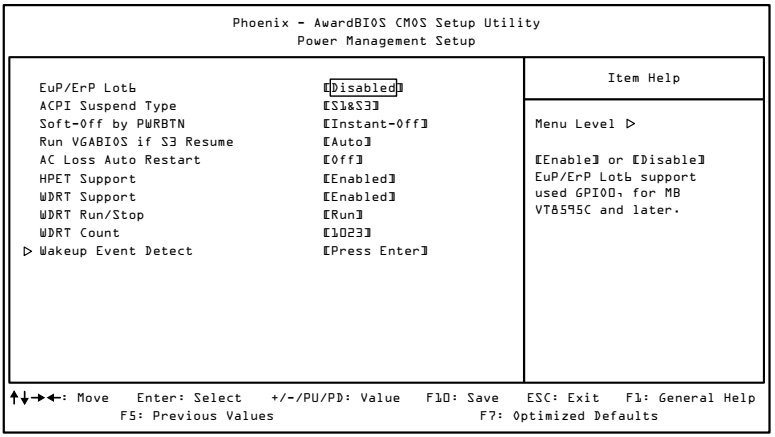
Settings: [Disabled, Enabled]

6.19.6. USB Storage Function

Enable or disable legacy support of USB mass storage.

Settings: [Disabled, Enabled]

6.20. Power Management Setup


Phoenix - AwardBIOS CMOS Setup Utility
Power Management Setup
EuP/ErP Lot6 [Disabled]
ACPI Suspend Type [S1&S3]
Soft-Off by PWRBTN [Instant-Off]
Run VGABIOS if S3 Resume [Auto]
AC Loss Auto Restart [Off]
HPET Support [Enabled]
WDRT Support [Enabled]
WDRT Run/Stop [Run]
WDRT Count [1023]
▷ Wakeup Event Detect [Press Enter]
Item Help
Menu Level ▷
[Enable] or [Disable] EuP/ErP Lot6 support used GPIO0, for MB VT8595C and later.
↑↓→←: Move Enter: Select +/-/PU/PD: Value F10: Save ESC: Exit F1: General Help
F5: Previous Values F7: Optimized Defaults

The Power Management Setup section includes the following submenus:

☐ Wakeup Event Detect

6.20.1. EuP/ErP Lot6

This feature determines whether to let the system consume less power ACPI S3/S4/S5 state.

Settings: [Disabled, Enabled]

Note:
When EuP/ErP Lot6 support is enabled, the Wake on LAN from system OS ACPI S3/S4/S5 state will be disabled.

6.20.2. ACPI Suspend Type

Settings	Description
S1(POS)	S1/Power On Suspend (POS) is a low power state. In this state, no system context (CPU or chipset) is lost and hardware maintains all system contexts.
S3(STR)	S3/Suspend To RAM (STR) is a power-down state. In this state, power is supplied only to essential components such as main memory and

	wakeup-capable devices. The system context is saved to main memory, and context is restored from the memory when a "wakeup" event occurs.
S1 & S3	Depends on the OS to select S1 or S3.

6.20.3. Soft-Off by PWRBTN

Settings	Description
Delay 4 Sec	System is turned off if power button is pressed for more than four seconds.
Instant-Off	Power button functions as a normal power-on/-off button.

6.20.4. Run VGABIOS if S3 Resume

Select whether to run VGA BIOS if resuming from S3 state. This is only necessary for older VGA drivers.

Settings: [Auto, Yes, No]

6.20.5. AC Loss Auto Restart

The field defines how the system will respond after an AC power loss during system operation.

Settings	Description
Off	Keeps the system in an off state until the power button is pressed
On	Restarts the system when the power is back
Former-Sts	Former-Sts

6.20.6. HPET Support

Settings: [Disabled, Enabled]

6.20.7. WDRT Support

Settings: [Disabled, Enabled

6.20.8. WDRT Run/Stop

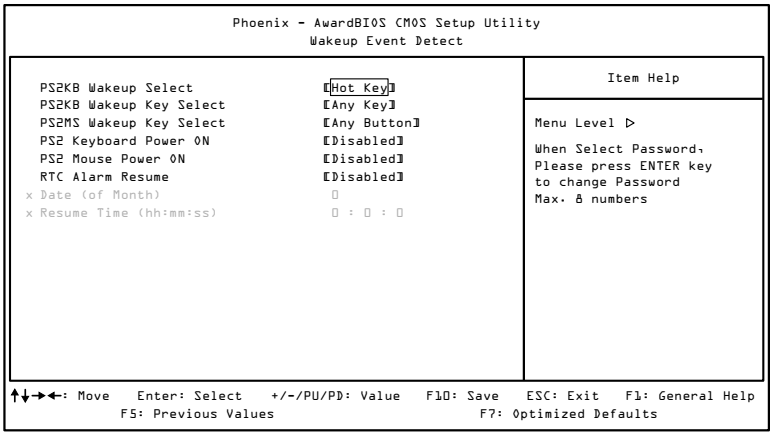
Settings: [Stop, Run]

6.20.9. WDRT Count

Key in a DEC number.

Settings: [Min = 0, Max = 1023]

6.21. Wakeup Event Detect


Phoenix - AwardBIOS CMOS Setup Utility
Wakeup Event Detect
PS2KB Wakeup Select [Hot Key]
PS2KB Wakeup Key Select [Any Key]
PS2MS Wakeup Key Select [Any Button]
PS2 Keyboard Power ON [Disabled]
PS2 Mouse Power ON [Disabled]
RTC Alarm Resume [Disabled]
x Date (of Month) 0
x Resume Time (hh:mm:ss) 0 : 0 : 0
Item Help
Menu Level ▷
When Select Password,
Please press ENTER key
to change Password
Max. 8 numbers
↑↓→←: Move Enter: Select +/-/PU/PD: Value F10: Save ESC: Exit F1: General Help
F5: Previous Values F7: Optimized Defaults

6.21.1. PS2KB Wakeup Select

This feature has two settings: Hot Key and Password. To select the Password option, press <Page Up> or <Page Down>. To set the password, enter up to eight digits and press <Enter>.

Settings: [Hot Key]

6.21.2. PS2KB Wakeup Key Select

This feature is only available when "Hot Key" is chosen in "PS2KB Wakeup Select".

Settings: [Ctrl+F1, Ctrl+F2, Ctrl+F3, Ctrl+F4, Ctrl+F5, Ctrl+F6, Ctrl+F7, Ctrl+F8, Ctrl+F9, Ctrl+F10, Ctrl+F11, Ctrl+F12, Power, Wake, Any Key]

6.21.3. PS2MS Wakeup Key Select

Enables any mouse activity to restore the system from the power saving mode to an active state.

Settings: [Any Button, Left Button, Right Button]

6.21.4. PS2 Keyboard Power ON

Settings: [Disabled, Enabled]

6.21.5. PS2 Mouse Power ON

Settings: [Disabled, Enabled]

6.21.6. RTC Alarm Resume

Set a scheduled time and/or date to automatically power on the system.
Settings: [Disabled, Enabled]

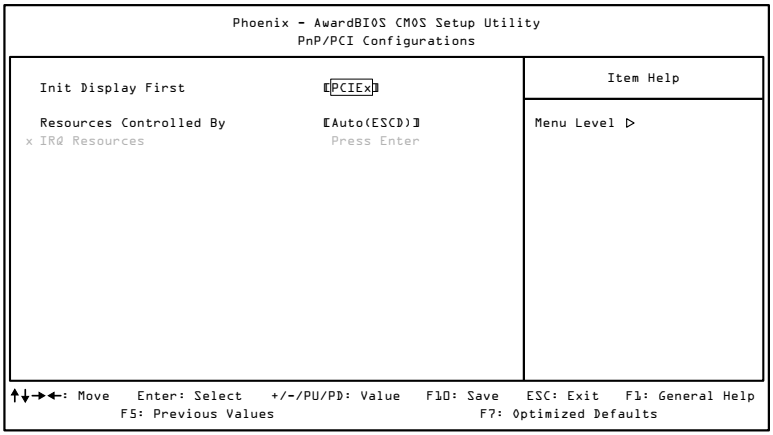
6.21.7. Date (of Month)

This field can only be set if "RTC Alarm Resume" is enabled. The field specifies the date for "RTC Alarm Resume".

6.21.8. Resume Time (hh:mm:ss)

This field can only be set if "RTC Alarm Resume" is enabled. The field specifies the time for "RTC Alarm Resume".

6.22. PnP/PCI Configurations



Note:

This section covers some very technical items and it is strongly recommended to leave the default settings as is unless you are an experienced user.

6.22.1. Init Display First

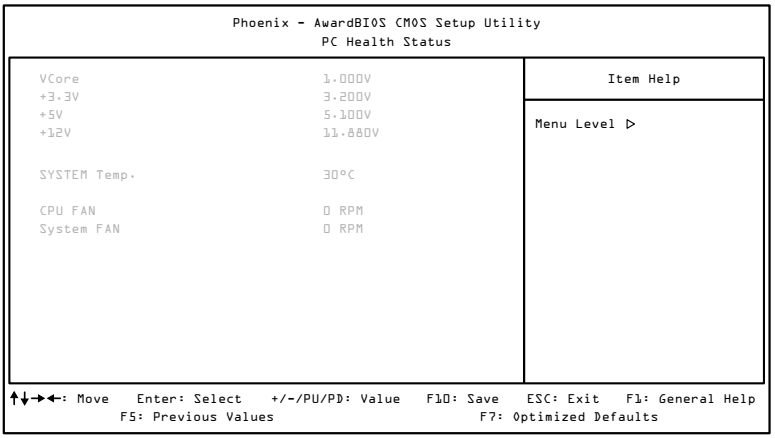
Settings: [PCI slot, Onboard, PCIEx]

6.22.2. Resources Controlled By

Enables the BIOS to automatically configure all the Plug-and-Play compatible devices.

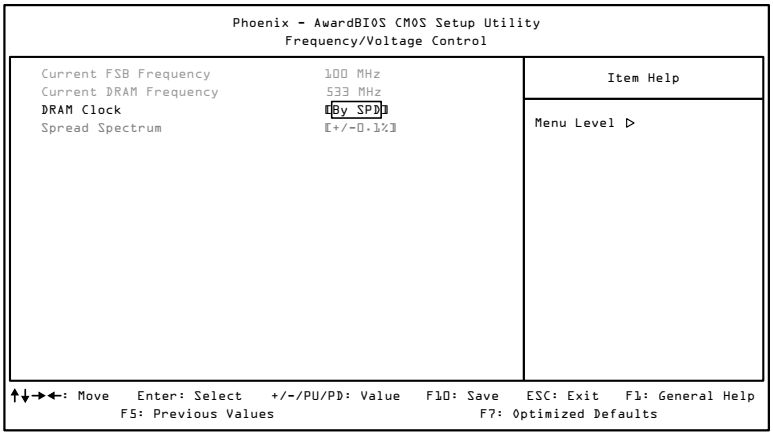
Settings	Description
Auto(ESCD)	BIOS will automatically assign IRQ, DMA and memory base address fields
Manual	Unlocks "IRQ Resources" for manual configuration

6.23 PC Health Status


Phoenix - AwardBIOS CMOS Setup Utility
PC Health Status
VCore 1.000V
+3.3V 3.200V
+5V 5.100V
+12V 11.880V
SYSTEM Temp. 30°C
CPU FAN 0 RPM
System FAN 0 RPM
Item Help
Menu Level ▷
↑↓→←: Move Enter: Select +/-/PU/PD: Value F10: Save ESC: Exit F1: General Help
F5: Previous Values F7: Optimized Defaults

The PC Health Status displays the current status of all of the monitored hardware devices/components such as CPU voltages, temperatures and fan speeds.

6.24 Frequency/Voltage Control


Phoenix - AwardBIOS CMOS Setup Utility
Frequency/Voltage Control
Current FSB Frequency 100 MHz
Current DRAM Frequency 533 MHz
DRAM Clock [By SPD]
Spread Spectrum [+/-0.1%]
Item Help
Menu Level ▷
↑↓→←: Move Enter: Select +/-/PU/PD: Value F10: Save ESC: Exit F1: General Help
F5: Previous Values F7: Optimized Defaults

6.24.1 DRAM Clock

This chipset supports synchronous and asynchronous mode between host clock and DRAM clock frequency.

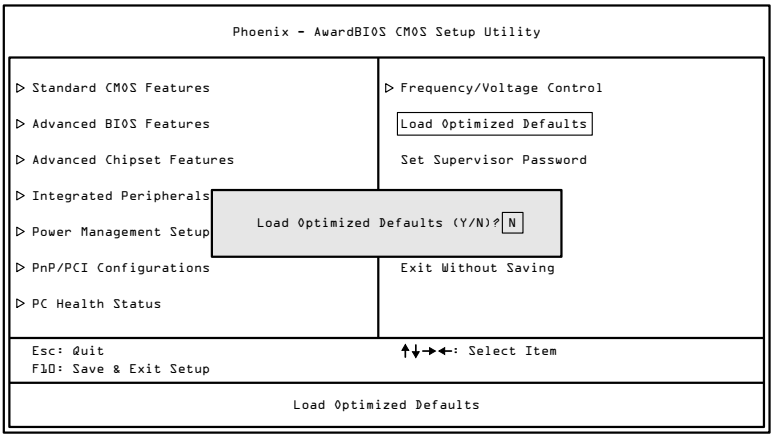
Settings: [By SPD, 400 MHz, 533 MHz]

6.24.2 Spread Spectrum

When the mainboard's clock generator pulses, the extreme values (spikes) of the pulses create EMI (Electromagnetic Interference). The Spread Spectrum function reduces the EMI generated by modulating the pulses so that the spikes of the pulses are reduced to flatter curves.

Settings: [Disabled, +/- 0.1%, +/- 0.2%, +/- 0.3%, +/- 0.4%, +/- 0.5%, +/- 0.6%, +/- 0.7%, +/- 0.8%, +/- 0.9%]

6.25 Load Optimized Defaults

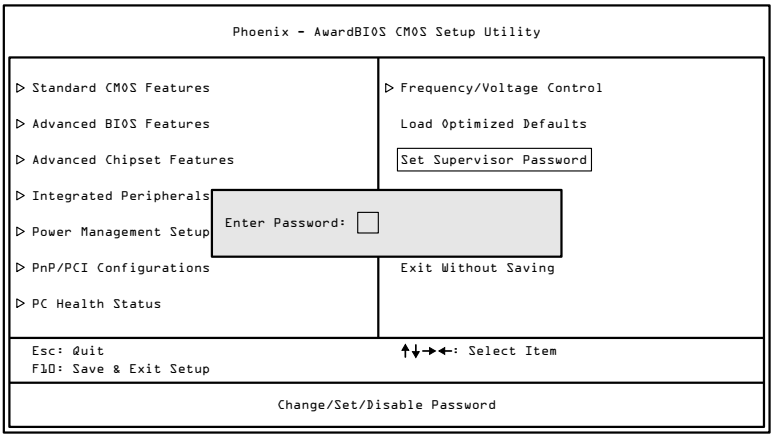


This option is for restoring all the default optimized BIOS settings. The default optimized values are set by the mainboard manufacturer to provide a stable system with optimized performance.

Entering "**Y**" and press <Enter> to load the default optimized BIOS values.

Entering "**N**" will cancel the load optimized defaults request.

6.26 Set Supervisor/User Password



This option is for setting a password for entering BIOS Setup. When a password has been set, a password prompt will be displayed whenever BIOS Setup is run. This prevents an unauthorized person from changing any part of your system configuration.

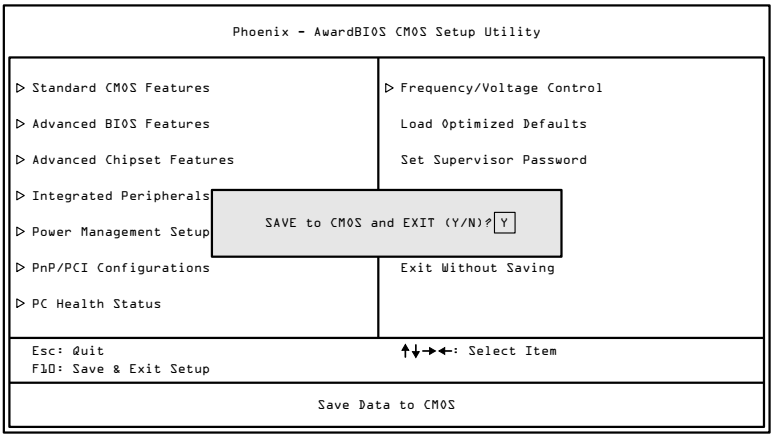
There are two types of passwords you can set. A supervisor password and a user password. When a supervisor password is used, the BIOS Setup program can be accessed and the BIOS settings can be changed. When a user password is used, the BIOS Setup program can be accessed but the BIOS settings cannot be changed.

To set the password, type the password (up to eight characters in length) and press **<Enter>**. The password typed now will clear any previously set password from CMOS memory. The new password will need to be reentered to be confirmed. To cancel the process press **<Esc>**.

To disable the password, press **<Enter>** when prompted to enter a new password. A message will show up to confirm disabling the password. To cancel the process press **<Esc>**.

Additionally, when a password is enabled, the BIOS can be set to request the password each time the system is booted. This would prevent unauthorized use of the system. See "Security Option" in the "Advanced BIOS Features" section for more details.

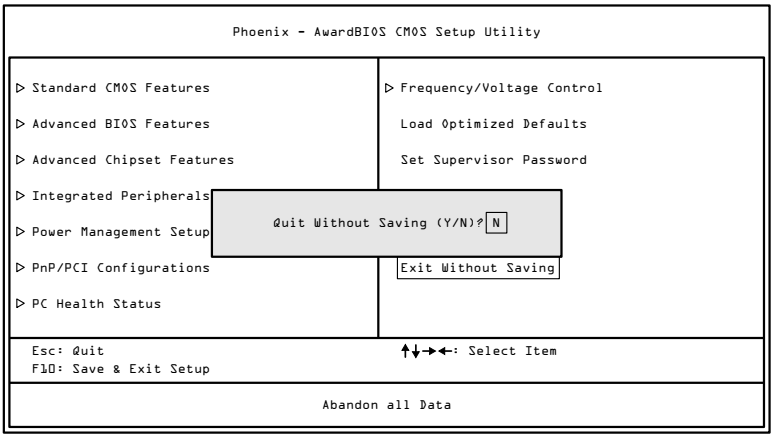
6.27 Save & Exit Setup



Entering "**Y**" saves any changes made, and exits the program.

Entering "**N**" will cancel the exit request.

6.28 Exit Without Saving



Entering "**Y**" discards any changes made and exits the program.

Entering "**N**" will cancel the exit request

7 Driver Installation

7.1 Microsoft Driver Support

The VIA VB7009 mainboard is compatible with Microsoft operating systems. The latest Windows drivers can be downloaded from the VIA Embedded website at www.viaembedded.com.

For embedded operating systems, the related drivers can be found in the VIA Embedded website at www.viaembedded.com.

7.2 Linux Driver Support

The VIA VB7009 mainboard is highly compatible with many Linux distributions.

Support and drivers are provided through various methods including:

- Drivers provided by VIA
- Using a driver built into a distribution package
- Visiting www.viaembedded.com for the latest updated drivers
- Installing a third party driver (such as the ALSA driver from the Advanced Linux Sound Architecture project for integrated audio)

For OEM clients and system integrators developing a product for long term production, other code and resources may also be made available. Contact VIA Embedded to submit a request.

Appendix A.
Power Consumption Report

Power consumption tests were performed on the VIA VB7009. The following tables represent the breakdown of the voltage, amp and wattage values while running common system applications.

A.1. VB7009-16

The tests were performed based on the following additional components:

- **CPU:** VIA C7®-D 1.6 GHz
- **Chipset:** VX900
- **Memory:** DDR3 DIMM Kingston HyperX 1600 MHz 4GB
- **HDD SATA:** Fujitsu MJA2250BH 250GB
- **DVD-ROM:** Sony CRX890S
- **Power supply:** ATX power supply SevenTeam ST-350GL 350W
- **Operating System:** Windows 7 32-bit

A.1.1. System Idle – Windows 7 32-bit

Power Plane	Volts	Amperes	Watts
+3.3V	3.161	0.650	2.055
+5V	4.845	3.080	14.923
+5VSB	5.033	0.068	0.342
+12V	11.975	0.086	1.030
		Total Power Consumption	18.350

A.1.2. S3 Status – Windows 7 Sleep

Power Plane	Volts	Amperes	Watts
+3.3V	-0.019	0.000	0.000
+5V	-0.010	0.011	0.000
+5VSB	5.080	0.370	1.880
+12V	-0.020	0.009	0.000
		Total Power Consumption	1.880

A.1.3. MP3 Playback – Windows Media Player10

Power Plane	Volts	Amperes	Watts
+3.3V	3.192	0.680	2.171
+5V	4.917	2.240	11.014
+5VSB	5.104	0.057	0.291
+12V	11.998	0.086	1.032
		Total Power Consumption	14.508

A.1.4. DVD Playback – PowerDVD 8.0

Power Plane	Volts	Amperes	Watts
+3.3V	2.955	0.650	1.921
+5V	4.675	4.153	19.415
+5VSB	4.857	0.112	0.544
+12V	11.905	0.078	0.929
		Total Power Consumption	22.809

A.1.5. Graphics – Run 3DMarks'06

Power Plane	Volts	Amperes	Watts
+3.3V	2.979	0.660	1.966
+5V	4.576	4.950	22.651

+5VSB	4.786	0.227	1.086
+12V	11.884	0.065	0.772
		Total Power Consumption	26.475

A.1.6. Functional Test – Run Passmark BurnIn test 6.0

Power Plane	Volts	Amperes	Watts
+3.3V	2.797	0.630	1.762
+5V	4.390	6.450	28.316
+5VSB	4.620	0.361	1.668
+12V	11.762	0.074	0.870
		Total Power Consumption	32.616

A.1.7. Network Access <Single LAN> – Gigabit Ethernet File Transmitting

Power Plane	Volts	Amperes	Watts
+3.3V	2.798	0.640	1.791
+5V	4.420	6.254	27.643
+5VSB	4.636	0.424	1.966
+12V	11.774	0.071	0.836
		Total Power Consumption	32.236

A.1.8. Network Access <Dual LAN> – Gigabit Ethernet File Transmitting

Power Plane	Volts	Amperes	Watts
+3.3V	2.966	0.730	2.165
+5V	4.489	7.204	32.339
+5VSB	4.710	0.452	2.129
+12V	11.880	0.090	1.069
		Total Power Consumption	37.702

A.2. VB7009-10E

The tests were performed based on the following additional components:

- **CPU:** VIA C7® 1.0 GHz
- **Chipset:** VX900
- **Memory:** DDR3 DIMM Kingston HyperX 1600 MHz 4GB
- **HDD SATA:** Fujitsu MJA2250BH 250GB
- **DVD-ROM:** Sony CRX890S
- **Power supply:** ATX power supply SevenTeam ST-350GL 350W
- **Operating System:** Windows 7 32-bit

A.2.1. System Idle – Windows 7 32-bit

Power Plane	Volts	Amperes	Watts
+3.3V	3.248	0.700	2.274
+5V	4.969	1.545	7.677
+5VSB	5.173	0.053	0.274
+12V	12.052	0.035	0.422
		Total Power Consumption	10.647

A.2.2. S3 Status – Windows 7 Sleep

Power Plane	Volts	Amperes	Watts
+3.3V	-0.016	0.000	0.000
+5V	-0.008	0.009	0.000
+5VSB	5.071	0.365	1.851
+12V	-0.017	0.005	0.000
		Total Power Consumption	1.851

A.2.3. MP3 Playback – Windows Media Player10

Power Plane	Volts	Amperes	Watts
+3.3V	3.233	0.710	2.295
+5V	4.942	1.827	9.029
+5VSB	5.145	0.062	0.319
+12V	12.051	0.031	0.374
		Total Power Consumption	12.017

A.2.4. DVD Playback – PowerDVD 8.0

Power Plane	Volts	Amperes	Watts
+3.3V	3.186	0.700	2.230
+5V	4.880	2.060	10.053
+5VSB	5.085	0.071	0.361
+12V	12.030	0.040	0.481
		Total Power Consumption	13.125

A.2.5. Graphics – Run 3DMarks'06

Power Plane	Volts	Amperes	Watts
+3.3V	3.175	0.700	2.223
+5V	4.863	2.191	10.655
+5VSB	5.071	0.074	0.375
+12V	12.002	0.040	0.480
		Total Power Consumption	13.733

A.2.6. Functional Test – Run Passmark BurnIn test 6.0

Power Plane	Volts	Amperes	Watts
+3.3V	3.221	0.710	2.287
+5V	4.918	2.050	10.082
+5VSB	5.124	0.068	0.348
+12V	12.049	0.033	0.398
		Total Power Consumption	13.115

A.2.7. Network Access <Single LAN> – Gigabit Ethernet File Transmitting

Power Plane	Volts	Amperes	Watts
+3.3V	3.083	0.700	2.158
+5V	4.700	3.573	16.793
+5VSB	4.868	0.147	0.716
+12V	11.961	0.045	0.538
		Total Power Consumption	20.205

A.2.8. Network Access <Dual LAN> – Gigabit Ethernet File Transmitting

Power Plane	Volts	Amperes	Watts
+3.3V	3.078	0.690	2.124
+5V	4.695	3.606	16.930
+5VSB	4.864	0.144	0.700
+12V	11.954	0.040	0.478
		Total Power Consumption	20.232

A.3. VB7009-12XC

The tests were performed based on the following additional components:

- **CPU:** VIA NanoX2 1.2 GHz
- **Chipset:** VX900
- **Memory:** DDR3 DIMM Kingston HyperX 1600 MHz 4GB
- **HDD SATA:** Fujitsu MJA2250BH 250GB
- **DVD-ROM:** Sony CRX890S
- **Power supply:** ATX power supply SevenTeam ST-350GL 350W
- **Operating System:** Windows 7 32-bit

A.3.1. System Idle – Windows 7 32-bit

Power Plane	Volts	Amperes	Watts
+3.3V	3.065	0.656	2.011
+5V	4.725	2.378	11.236
+5VSB	4.890	0.096	0.469
+12V	12.032	0.072	0.866
		Total Power Consumption	14.582

A.3.2. S3 Status – Windows 7 Sleep

Power Plane	Volts	Amperes	Watts
+3.3V	-0.016	-0.026	0.000
+5V	-0.005	-0.040	0.000
+5VSB	5.040	0.317	1.598
+12V	-0.017	-0.019	0.000
		Total Power Consumption	1.598

A.3.3. MP3 Playback – Windows Media Player10

Power Plane	Volts	Amperes	Watts
+3.3V	2.998	0.658	1.973
+5V	4.664	2.577	12.019
+5VSB	4.811	0.098	0.471
+12V	11.971	0.075	0.898
		Total Power Consumption	15.361

A.3.4. DVD Playback – Windows Media Player10

Power Plane	Volts	Amperes	Watts
+3.3V	2.990	0.653	1.952
+5V	4.673	2.345	10.958
+5VSB	4.846	0.078	0.378
+12V	11.928	0.077	0.918
		Total Power Consumption	14.206

A.3.5. Graphics – Run 3DMarks'06

Power Plane	Volts	Amperes	Watts
+3.3V	3.000	0.621	1.863
+5V	4.665	3.205	14.951
+5VSB	4.846	0.075	0.363
+12V	11.990	0.063	0.755
		Total Power Consumption	17.932

A.3.6. Functional Test – Run Passmark BurnIn test 6.0

Power Plane	Volts	Amperes	Watts
+3.3V	2.993	0.567	1.697
+5V	4.599	6.052	27.833
+5VSB	4.715	0.108	0.509
+12V	11.992	0.038	0.456
		Total Power Consumption	30.495

A.3.7. Network Access <Single LAN> – Gigabit Ethernet File Transmitting

Power Plane	Volts	Amperes	Watts
+3.3V	2.889	0.591	1.707
+5V	4.526	4.192	18.973
+5VSB	4.666	0.114	0.532
+12V	11.899	0.052	0.619
		Total Power Consumption	21.831

A.3.8. Network Access <Dual LAN> – Gigabit Ethernet File Transmitting

Power Plane	Volts	Amperes	Watts
+3.3V	0.001	0.608	0.001
+5V	4.637	4.340	20.125
+5VSB	4.779	0.122	0.583
+12V	12.020	0.054	0.649
		Total Power Consumption	21.358

A.3.9. S5 Status – Windows 7 Shut down

Power Plane	Volts	Amperes	Watts
+3.3V	-0.028	-0.019	0.000
+5V	-0.020	-0.027	0.000
+5VSB	5.031	0.361	1.816
+12V	-0.028	-0.012	0.000
		Total Power Consumption	1.816

Appendix B.
Mating Connector Vendor Lists

The following tables listed the mating connector vendor lists of VB7009 mainboard.

Connectors	Part No.	Mating Vendor & P/N	
F_Audio	99G30-05126I	Neltron	SAMTEC SSW Series
		2214S-XXG-85	
		2214R-XXG-85	
F_PANEL	99G30-05009I	Neltron	SAMTEC SSW Series
		2214S-XXG-85	
		2214R-XXG-85	
FAN	99G30-020035	Neltron	N/A
		2218H-03	N/A
Inverter	99G30-020537	ACES	MOLEX
		85206-0800	51021-**00
LVDS	99G30-170152	ACES	HRS
		44002-4000	DF13-**DS-1.258C
USB	99G30-05072K	Neltron	SAMTEC SSW Series
		2214S-XXG-85	
		2214R-XXG-85	

Table 33: VB7009 mating connector vendor lists

VIA Embedded

Taiwan Headquarters
1F, 531 Zhong-Zheng Road
Xindian District, New Taipei City 231,
Taiwan

TEL: 886.2.2218.5452
FAX: 886.2.2218.5453
Email: embedded@via.com.tw

USA
940 Mission Court
Fremont, CA 94539
USA

TEL: 1.510.683.3300
FAX: 1.510.687.4654
Email: embedded@viatech.com

Europe
In den Dauen 6
53117 Bonn
Germany

TEL: 49.228.688565.0
FAX: 49.228.688565.19
Email: embedded@via-tech.de

China
Tsinghua Science Park Bldg. 7
No. 1 Zongguancun East Road
Haiden District, Beijing, 100084
China

TEL: 86.10.59852288
FAX: 86.10.59852299
Email: embedded@viatech.com.cn

Japan
3-15-7 Ebisu MT Bldg. 6F
Higashi, Shibuya-ku
Tokyo 150-0011
Japan

TEL: 81.3.5466.1637
FAX: 81.3.5466.1638
Email: embedded@viatech.co.jp

Korea
2F, Sangjin Bldg., 417
Dogok Dong, Gangnam-Gu
Seoul 135-854
South Korea

TEL: 82.2.571.2986
FAX: 82.2.571.2987
Email: embedded@via-korea.com